

v 3.7.1

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The software requires a "software" license.

In case you have no active license, the program's work is not limited, but a watermark is added to the video.

Use only English letters, numbers, point, hyphens, underscores in the names of paths, folders, files!

System requirements

Compatibility: Windows 11 22H2 x64, Canon cameras: EOS R5 Mark II PowerShot V10 EOS R100 PowerShot ZOOM **EOS R50** EOS R8 EOS R6 Mark II EOS R10 EOS R7 EOS R3 EOS Kiss M2 / EOS M50 Mark II EOS Kiss X10i / EOS Rebel T8i / EOS 850D / EOS Ra EOS-1D X Mark III EOS M200 EOS M6 Mark II **EOS 90D** PowerShot G7X Mark III PowerShot G5X Mark II EOS Kiss X10 / EOS Rebel SL3 / EOS 250D / EOS 200D II EOS RP PowerShot SX70 HS EOS R EOS Kiss M / EOS M50 EOS Kiss X90 / EOS REBEL T7 / EOS 2000D / EOS 1500D EOS REBEL T100 / EOS 4000D / EOS 3000D EOS M100 EOS 6D Mark II EOS Kiss X9 / EOS Rebel SL2 / EOS 200D

EOS Kiss X9i / EOS Rebel T7i / EOS 800D EOS 9000D / EOS 77D EOS M6 EOS M5 EOS 5D Mark IV EOS-1D X Mark II EOS 80D EOS Kiss X80 / EOS Rebel T6 / EOS 1300D EOS M10 EOS 5DS EOS 5DS R EOS 8000D / EOS REBEL T6s / EOS 760D EOS Kiss X8i / EOS REBEL T6i / EOS 750D EOS M3 EOS 7D Mark II EOS Kiss X70 / EOS 1200D / EOS REBEL T5 / EOS Hi EOS M2 EOS 70D EOS Kiss X7 / EOS 100D / EOS REBEL SL1 EOS Kiss X7i / EOS 700D / EOS REBEL T5i EOS-1D C EOS 6D EOS M EOS Kiss X6i / EOS 650D / EOS REBEL T4i EOS-1D X EOS 5D Mark III EOS Kiss X50 / EOS REBEL T3 / EOS 1100D EOS Kiss X5 / EOS REBEL T3i / EOS 600D EOS 60D EOS Kiss X4 / EOS REBEL T2i / EOS 550D EOS-1D Mark IV EOS 7D EOS Kiss X3 / EOS REBEL T1i / EOS 500D EOS 5D Mark II EOS 50D EOS DIGITAL REBEL XS / 1000D/ KISS F EOS DIGITAL REBEL Xsi / 450D / Kiss X2 EOS-1Ds Mark III

EOS 40D EOS-1D Mark III

Recommended computer: Intel i5 (8th Gen and above), i7 (4 or more cores), SSD, at least 8GB RAM (up to 15 cameras), at least 16GB RAM (more than 15 cameras).

When using AI: at least 16GB RAM (up to 15 cameras), at least 24GB RAM (more than 15 cameras), nvidia GTX 1050 and above or RTX at least 4GB VRAM. AI works on Cuda SDK 6.0 and up and takes more than 3GB of VRAM!

When using two AIs (RB AI and SM AI) on the GPU, at least 8GB of VRAM is required. It is recommended to use i7 (10 generation and above).

If there is not enough VRAM, SM AI can run on the CPU. And in the absence of a compatible graphics card, both AIs run on the CPU. But AI runs many times slower on the CPU, which is only good for testing.

Required software:

- .NET 8.0 Desktop Runtime Windows x64
 <u>https://dotnet.microsoft.com/en-us/download/dotnet/thank-you/runtime-desktop-8.0.8-windows-x64-installer</u>
- 2. Codecs. Recommended K-Lite Codec Pack Mega. https://codecguide.com/download_kl.htm
- 3. Latest drivers for the video card. <u>https://www.nvidia.com/Download/index.aspx</u>
- 4. Microsoft Visual C ++ 2019 redistributable component (both x86 and x64 versions). <u>https://aka.ms/vs/17/release/vc_redist.x86.exe</u> <u>https://aka.ms/vs/17/release/vc_redist.x64.exe</u>

Recommended camera settings

To reduce lag and color difference, it is recommended to reset the camera settings to factory settings, and then disable the following options: Red-eye reduct., Auto Lightning Optimizer.

It is recommended to make sure that all cameras have the same firmware version.

Description of the program interface

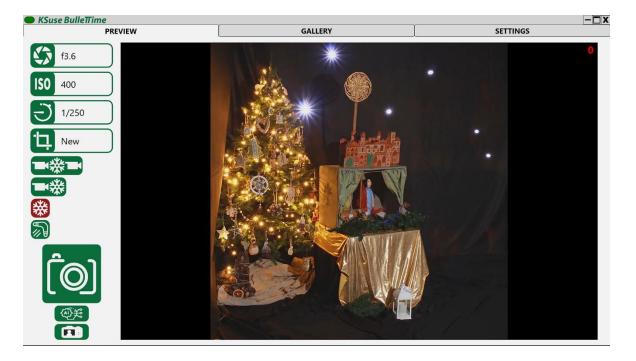
View window (on the second monitor)

•		
	36->36	
		1/J

The viewing window is displayed on the second monitor for participants and photographer. This window displays the last video, displays a status indicator and information about the current shooting settings.

The display of indicators and buttons can be turned on / off in the settings.

The main software interface



In this window, we can also see the last shot, change the settings or take a photo. Right clicking on the large button turns on / off the camera preparation mode (when syncing via usb or having a DzenTech or Esper trigger). When you left-click on the large button, a picture is taken. In addition, the Enter key corresponds to a click on this button. Shooting may be done without waiting for the end of processing the previous frame. It is not recommended to shoot before finishing the processing of the previous frame.

Below is a button to send the last video to the AI processing queue.

The bottom left button to turn on / off the "live mirror" mode.

The bottom right button is used to upload the latest video to ftp. This button is hidden if a ftp connection is not available.

4 buttons in the upper part are responsible for the choice:

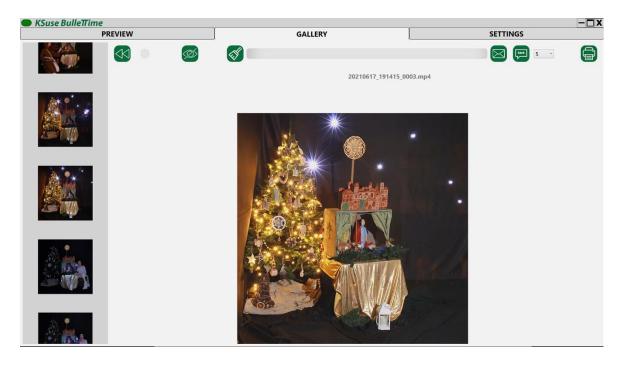
- aperture value (the list consists of currently available on cameras).
- ISO (list consists of currently available on cameras).
- shutter speed (the list consists of currently available on cameras). In Bulb mode, the first click starts shooting, the second one stops.
- Preset.

Selection is possible among presets that are in the "Enabled" state. At least one preset must be in this state.

The slider is used to set the delay between camera shots in boomerang mode. For boomerang, there are 5 modes: uniform, with deceleration, with acceleration, with deceleration towards the center, with acceleration towards the center. In addition, the following modes are available: freeze, video + bullet, video + bullet + video.

You can choose the direction of the boomerang: one way or diverging from the center.

Gallery



Video is added to the video frame list immediately after its processing.

When you click on the image in the upper slider, it opens the corresponding video in the viewing block.

An email address is entered in the field (focus is always on it, there is no need to place the cursor in the field for keyboard input).

A button with a broom icon is used to clear the field with the mail address.

The slider is scrolled by a mouse click and up and down arrows.

Only files created or modified in the last 12 hours (by default) are displayed in the gallery!



- enable / disable automatic rewind to the last photo



- open the last photo

- clear address

Ctrl + D - delete the video. The video is hidden from the gallery and all web pages. Emails with this video cannot be sent.

Ctrl + H or <a>

 - hide the video. The video is hidden from the gallery and all web pages. Emails with this video can be sent.

The "Print" button and the choice of camera for printing appears when the option "Save source" is selected in the options.

The "Upload to ftp" button is displayed when connecting to ftp is available.

Attention! The program does not control the printer settings. It sends the photo to print to the printer set in Windows by the default printer, stretching the image to the paper size set in the printer properties.

The web version of the gallery is also available.



On any device connected to the same network as a computer with BulleTTime software, you must open any browser and enter the IP address of the computer with BulleTTime software in the address bar.

The web gallery and carousel addresses are displayed in the "Settings - Main - Web".

For the web gallery to work correctly, you must allow access via the TCP protocol for port 80 in the firewall, or disable the firewall. It is also necessary to turn off any other programs that may use port 80 before starting KSuse BulleTTime.

Sort settings window

		P	REVIEW	1				c	GALLERY							SET	TING	iS		
CA	MERA ORDER	1		MAIN	1	S	ENDING	A	DJUSTMENT		BRANDING		L	INT	ERNET	GALLERY		P	OST-PROCES	SING
	Reconnect		Refresh da	ata	Reset state			f8			Av		M Fin	e				~ Q	uality	
								1/250		*	Tv		Auto:	Ambie	ence pric	ority		~ w	hite balance	
	10 cameras co	onnected						100			ISO		Portra	it				· Pi	ture style	
	Export			Import		Sort o	ut			10	Number of cameras									
Order	BodyID	Batter	y AF	AE Mode	Focal length	Downloade	Is waiting for shot	Save s			Unlock cameras								Take photo	
	243073056221	(%) -1	OneShot	Manual		d, %	False	Jave s	erangs		Uniock cameras								Take photo	
	133072071984	-1	OneShot	Manual		0	False													
	243073056217	-1	OneShot	Manual		0	False	Stop LV	Update preview	AF	Focus <<<	~~	<	>	>> >	>> au	to WB	WB click	Fit	Zo
	243073056150	-1	OneShot	Manual		0	False				1000								1.47	
	133072071875	-1	OneShot	Manual		0	False			Rotation			5		C	DD		-Hereita -	٨	
	133072071878	-1	OneShot	Manual		0	False					100	0		U	Pid	0		<	>
	133072071999	-1	OneShot	Manual		0	False												v	
	133072071879	-1	OneShot	Manual		0	False													
	133072073392	-1	OneShot	Manual		0	False													
-	243073056215	-1	OneShot	Manual		0	False												Top ind	
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									the second se										Heigh	
																			- 20	
																			Measurem	nent a
																			Top ind	lent,%
																			- 58	3
																			Widt	
																			- 5	
																			Heigl	
																			- 20	
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After changing the order of cameras or software operation mode, you must click "Save Settings" before switching to another window or starting shooting!

Setting the order of the cameras (the order of gluing frames) is done by dragging them with the mouse while holding down the shift key. To see the picture from the camera, you can click "Run LV", the order of the cameras does not change.

The second way to sort cameras:

- 1. Click the "Sort out" button.
- 2. Press the shutter button on each camera in right order.
- 3. Press the "Sort out" button again.
- 4. Save settings.

When a problem with the camera is detected, the status indicator turns red and the line of the camera with a failure is highlighted in red.

When a camera with incorrect settings is detected, the indicator turns magenta.

When the cameras are disconnected, using the "Number of cameras" field, you can set the required number that you want to save in the settings, for example, for the correct work of post-processing.

In this window, you can choose the same settings as in the main software window plus additional ones: video duration, quality and white balance. The selected settings apply to all cameras.

For stable working of 1300D and high quality, the "M Fine" or "S1 Fine" modes are recommended.

"Reconnect" - Restarts camera clients.

"Update data" - Read the camera parameters again. For example, after disabling autofocus.

"Reset state" - Reset the snapshot state.

"Reset power" - Restart camera power (available with Dzen Tech trigger). After all the cameras are found by OS again, needs to restart the clients by clicking on "Reconnect".

Also, in this window are set the search area of the calibration markers.

You can view current search zones by enabling Live View.

Example: https://www.youtube.com/watch?v=BCDRiGaBMr0

Also, in this window it is possible to set the size of the exposure evaluation zone.

The camera has locked autofocus and disabled Live View after turning off the program. To use the camera outside the software, you must press the "Unlock cameras" button before turning off the program.

If you have IS STM lenses, or when autofocus is enabled on another lenses, you can adjust their focus from the program using the appropriate arrows.

The AF button starts autofocus, autofocus on the selected camera works all the time while the AF button is pressed. Shift+AF starts autofocus on all cameras at the same time.

"Fit" shows a preview of the entire frame.

"Zoom" enlarges 1/10 frame.

Using the arrows below these buttons, you can shift the zoom area relative to the full frame.

"auto WB" - manual white balance by the center point of the frame.

"WB click" - setting the white balance by the selected point in the Live View.

You must manually set the required image orientation! After selecting the rotation mode, you must save the settings!

General settings window

Be sure to click "Save Settings" when changing values in this window before switching to another window or starting a shooting!

hooting se	ttings						
KSuse BulleTTin	ne						-
	PREVIEW	Ĭ	GALLERY		Ĩ	SET	TINGS
CAMERA ORDER	MAIN	SENDING	ADJUSTMENT) BR	ANDING	INTERNET GALLERY	
SHOOTING	AF lock 1		FPS of	f regular video 10	¥		
MAIN	Mirror lockup 1 0		FI	PS of Al video 5	¥	(195)	ref 🛱 🐺
SCREENS	Continuous Shooting 1 0		Index of camcorder / o	center camera 5	¥		
WEB	Save to SD 1 0		Maximum video n	recording time 5			
						The current version is inst	illed
TRIGGER						Sync Al	
PATHS							
RINTING							
						Number of shots in the que	ue - 0
						Clear AI creation que	e
Save settings	Take photo		Clear cache				
24-04-16 19:32:07 Start listenin 24-04-16 19:32:07 AutoDiscove					•		
4-04-16 19:32:07 freeze 4-04-16 19:32:07 Window load	ded						
4-04-16 19:32:08 BulleTTime s 4-04-16 19:32:08 New license 4-04-16 19:32:12 File list recei	is received					Date End of Support	01 January 2025
4-04-16 19:32:13 Camera clier	t connected to transfer : Client 2					License is active until *	16 May 2024
4-04-16 19:32:13 Camera clier	at connected to transfer : Client 3 at connected to transfer : Client 4						* License ends at 00:00
	nt connected to transfer : Client 5 nt connected to transfer : Client 6					License type	lleval
4-04-16 19:32:14 Camera clier	at connected to transfer : Client 7						
4-04-16 19:32:14 Camera clier	nt connected to transfer : Client 9 nt connected to transfer : Client 8					Version	3.7.0.0
	at connected to transfer : Client 10 at connected to transfer : Client 11					Release date	16 April 2024
4-04-16 19:32:34 File list recei	ved						
:4-04-16 19:34:24 Downloaded	I : C:\ProgramData\ksuse.ru\KSuseAI\KSuseAIs.exe				~		

"FPS" - The base fps is always 30. When choosing a smaller value, the frames are duplicated. For example, when selecting 10fps each frame is repeated 3 times.

When using AI, virtual intermediate views are created instead of duplicates.

"Lock AF" - Programmatically autofocus lock. Software AF lock and burst mode apply to the following models: 1100D, Rebel T3, Kiss X50, 1200D, Rebel T5, Kiss X70, 1300D, Rebel T6, Kiss X80, 800D, Rebel T7i, Kiss X9i, 1500D, 2000D, Rebel T7, Kiss X90, 550D, Rebel T2i, Kiss X4. Software AF lock and burst mode can be applied to the following models: 3000D, 4000D, Rebel T100, 600D, Rebel T3i, Kiss X5. To prevent autofocus from interfering with shooting on other models, it is recommended to turn it off with the switch on the lens.

"Continuous Shooting" - Continuous shooting is performed while the shutter button is pressed. Available only when synchronizing via usb.

"Save to SD" - Photos are saved on the SD cards of cameras. Full, slow or poor-quality SD cards will cause a malfunction when shooting.

"Block mirror" - The first press of the shutter button raises the mirror; the second press takes a picture. Doesn't work in Bulb mode!

"Index of video camera / center camera" - Camera index, which will be used to shoot video in video + bullet mode.

"Maximum video recording duration" - The interval in seconds after which video recording in the "video+bullet" and "video+bullet+video" modes stops if the shutter button is not pressed.



- In the video records the movement forward and backward (cycle).



Records of motion only in one direction (available only with synchronization on usb).



 ${f V}$ - The minimum duration is equal to 4 seconds.



- In the video exactly one pass for easy editing.

You can use AI only after installing the AI module.

Installation is done using the "Synchronize AI" button.

To use AI and any post-processing, you must enable saving of stabilized HiRes.

General settings

P	REVIEW		GALLERY		ļ	SET	TINGS
CAMERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING		INTERNET GALLERY	POST-PROCESSIN
NG	Language English	w.	Re	verse Hotkeys (PgUp, PgDown) 1	0		Save source images 1
1	Theme KSuse	*		Enable PgUp global hotkey 1	0	Ad	dd BodylD to filename (sources)
45							Save stable HiRes 1
	Number of repeats of video with sound	in the galleries 0		Period of validity, hours 2	4		
ER	○ Stop vid	eo		Displayed indices start at 1 1	0		Save gif 1
<u>s</u>	Mute so	und		Check for beta versions 1	0		Set the size of gif 1
NG				Endless playback 1	0		Size of gif 0
		Debug mode 1 0					
	Mute the sound in the	build-in gallery 1		Test shooting 1	0		Set the size of the preview 1
	Mute the sound on the	e second screen 1		Shooting interval 2	0 ~		Size of the preview 0
Save settings	Take photo		Clear cache				
28 18:13:27 Start listening 808 28 18:13:27 AutoDiscovery::Se 28 18:13:28 freeze 28 18:13:28 Window loaded 28 18:13:28 BulletTime startec 28 18:13:29 New license is reco	vice Listening 8880/UDP (3.6.0.0)						
28 18:13:32 Camera client con	nected to transfer : Client 2					Date End of Support	01 January 2024
-28 18:13:32 Camera client con -28 18:13:32 Camera client con	nected to transfer : Client 4					License is active until *	28 May 2023
28 18:13:32 Camera client con 28 18:13:32 Camera client con	nected to transfer : Client 6						* License ends at 00:00
						License type	Usual
28 18:13:32 Camera client con 28 18:13:32 Camera client con						Version	3.6.0.0

The license is automatically extended for 7 days when you start the program if you have an Internet connection.

The ability to take a photo from the settings window is present only when the "freeze" or "boomerang" modes are on!

"Language" - Select the interface language.

"Theme" - Select the color palette of the interface.

"Save source images" - Enables saving photos received from cameras in jpg format.

"Save HiRes" - Enables saving of stabilized photos to the folder with sources until they are cropped and reduced.

"Save gif" - Specifies whether it is necessary to generate gif along with mp4.

"Set preview size" - Define your own jpg size for a preview.

"Preview size" - jpg size with a preview on the long side, with the size override enabled.

"Set gif size" - Defining your own gif size.

"Size gif" - Size gif on the long side, with the size override enabled.

"Test shooting" - Used to check the stability of the system. When enabled, produces a shot at a specified interval.

"Reverse Hotkeys (PgUp, PgDown)" - The ability to swap the hot keys Page Up and Page Down.

"Enable PgUp global hotkey" - When this mode is activated, only one PgUp hotkey works. The first press turns on the half-press, the second press takes a shot. The key works even when the program window is inactive. Attention! Fast and long presses do not work in this mode. Shooting in Bulb mode is not possible.

"Displayed indices begin with 1" - When you turn on it, the numbering of cameras will begin with 1 in the lists in sorting and calibration. Numbering of filenames, cameras in branding, sequences will always start from 0.

"Check beta version" - Enable notification of the release of a new software version in beta status.

"Endless Playback" turns on / off cyclic video playback in the "Preview", "Gallery" windows and on the second screen.

"Add BodyID to the filename (source)" - the name of the jpg file of the source and stabilized source can be in the form of a camera index _ BodyID, or just a camera index.

"Mute sound in the build-in gallery" - Mute / unmute the sound in the built-in gallery.

"Mute the sound on the second screen" - Mute / unmute the sound on the second screen.

"Number of repeats of video with sound in the galleries" - After selecting the video, the specified number of times is played, then the playback is stopped or the sound is turned off. 0 - unlimited.

You can limit the files displayed in the gallery by setting the number of hours from the current date to the date of creation or modification of the file (the maximum value of them). This quantity can be changed in the field "Period of validity, hours". The default value is 12. Videos older than the specified number of hours will not be displayed in galleries.

"Clear cache" - Clears the sync database.

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Settings of screens

P	REVIEW		GALLERY		SET	TINGS
CAMERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSING
DTING	Screens					
JIN	Main interface \\.\DISPL	AY4 v				
ENS						
-B	Viewer \\.\DISPL	AY1 ×	Show View	er 1 0	Force AI re	sults to be shown in the Viewer 1
GER					O	nly the final video in the Viewer 1
HS						Show start buttons 1
TING						
					Number of repr	ats of the video in the carousel 1
	Carousel \\\DISPL		Show Carous		reamber of repe	
Save settings	Carousel \\\DISPL		Show Carous Clear cache		rumuer or repo	
4-28 18:13:27 Start listening 808	Take photo				rumuer or repa	
4-28 18:13:27 Start listening 808 4-28 18:13:27 AutoDiscovery::Se 4-28 18:13:28 freeze	Take photo				rumuer or repa	as on the noted in the callodder (
4-28 18:13:27 Start listening 808 4-28 18:13:27 AutoDiscovery::Se 4-28 18:13:28 Freeze 4-28 18:13:28 Window loaded 4-28 18:13:28 BulleTTime started	0 0 vrice Listening 8880/JDP 1 (3.6.00)					
4-28 18:13:27 Start listening 808 4-28 18:13:27 AutoDiscovery:Se 4-28 18:13:28 freeze 4-28 18:13:28 Window loaded 4-28 18:13:28 BuilleTTime started 4-28 18:13:29 New license is rec 4-28 18:13:22 Camera client con	Take photo 0 1 (3.6.0) eved neted to transfer : Client 2				Date End of Support	01 January 2024
4-28 18:13:27 Start listening 808 4-28 18:13:27 AutoDiscovery:Se 4-28 18:13:28 Freeze 4-28 18:13:28 Window Iboaded 4-28 18:13:28 UBICTIme started 4-28 18:13:32 Camera dilett co 4-28 18:13:32 Camera dilett co 4-28 18:13:32 Camera dilett co 4-28 18:13:32 Camera dilett co 4-28 18:13:32 Camera dilett co	Take photo 0 vice Listening 8880/UDP 1(3.6.0.0) eved nected to transfer : Client 2 nected to transfer : Client 3 nected to transfer : Client 4					01 January 2024 28 May 2023
4-28 18:13:27 Start listening 808 4-28 18:13:27 AutoDiscovery:5e 4-28 18:13:28 Hindow Loaded 4-28 18:13:28 Window Loaded 4-28 18:13:28 URICTIMe starter 4-28 18:13:29 LOADERT Starter Starter 4-28 18:13:22 Camera client con 4-28 18:13:32 Camera client con	Take photo 0 0 1(3.6.00) evice Listening 8880/UDP 1(3.6.00) eviced nected to transfer : Client 2 nected to transfer : Client 3 nected to transfer : Client 4 nected to transfer : Client 5 nected to transfer : Client 6 nected to transfer : Client 7				Date End of Support License is active until *	01 January 2024 28 May 2023 * License ends at 00:00
4-28 18:13:27 Start listening 808 4-28 18:13:27 AutoDiscovery:5e 4-28 18:13:28 Hrezz 4-28 18:13:28 Window loaded 4-28 18:13:28 UBITTime starter 4-28 18:13:22 Camera client con 4-28 18:13:32 Camera client con	Take photo 0 vrice Listening 8880/UDP 1(3.6.0.0) eviced nected to transfer : Client 2 nected to transfer : Client 3 nected to transfer : Client 4 nected to transfer : Client 5 nected to transfer : Client 6 nected to transfer : Client 7 nected to transfer : Client 7 nected to transfer : Client 8 nected to transfer : Client 9				Date End of Support	01 January 2024 28 May 2023 * License ends at 00:00 Usual

To connect cameras through other computers, you must allow udp access to ports 8880-8882 and tcp access to port 445 in the firewall, or disable the firewall.

It is also necessary to enable the option "Turn off password protected sharing" in the "Network and Sharing Center".

"Show Viewer " - Enable / disable the viewing window of the last video with work state indicators.

"Only the final video in the Viewer" - Disables the display of work state indicators and intermediate results.

"Show start buttons" - Enables the display of buttons in the Viewer.

"Show Carousel" - Enable / Disable the view window of the entire captured video.

3.7.1

Webpages Settings

	PR	EVIEW		GALLERY				SET	TINGS	
CAN	MERA ORDER	MAIN	SENDING	ADJUSTMENT		BRANDING]	INTERNET GALLERY	POST-PROCES	SING
DTING AIN EENS EB	○ Use icc	Run a web server 1 0 Theme KSuse Version of gallery 2 ~	×	Type of video in the we Type of video on *1			* *		Web gallery: http://192.168.18.1383 Web carouse: http://192.168.18.1383 Uast video: http://192.168.18.13830 Show video controls (web) Erase address after sending	<u>8:8080</u> 180/las
iger Ths	• Use tex	t Mail domains		Type of video on "carou Preview size in we		Normal only	v		Blocking tooltips	1
TING	inboxru gmail.com	Add		Web server port (def Type of field with emai Autoscroll pause (web only) Scrolling step for thumbnails in the w Period of validity (web)	address seconds b gallery	email * 120 3		netsh advfirewall firewall act action = allow program = "C:\P \KSuse_BulleTTime_3.5.10.\k		1
)4-28 1)4-28 1	Save settings 8:13:27 Start listening 8080 8:13:27 AutoDiscovery::Serv 8:13:28 freeze	Take photo		Clear cache						
04-28 1 04-28 1	8:13:28 Window loaded 8:13:28 Buller Time started (8:13:29 New license is recei 8:13:22 Camera client conno 8:13:22 Camera client conno 8:13:	ved scted to transfer : Client 2 scted to transfer : Client 3 scted to transfer : Client 4 scted to transfer : Client 5 scted to transfer : Client 7 scted to transfer : Client 7 scted to transfer : Client 8 scted to transfer : Client 8 scted to transfer : Client 9						Date End of Support License is active until * License type Version	28 May 2023 * License ends at 00:00 Usual	

The option "Run web server" applies only when the program is restarted!

"Version of gallery" - a choice of two layout options for the web gallery.

The web gallery displays only regular videos, only video after being processed by AI, or first a regular video, which is replaced with video processed using AI, as soon as it is ready.

For the field types "email" and "text", a different virtual keyboard is displayed. Validation for compliance with the format is used for the field with the type "email", but there is no autocomplete on iOS devices.

"Erase the address after sending" - automatic cleaning of the field with the address immediately after sending.

"Blocking tooltips" - disable autocomplete.

"Show video controls (web)" - displaying controls on the pages "last video" and "carousel".

"Period of validity (web), seconds" - Videos older than the specified number of seconds will not be displayed on web pages.

The specified domains are displayed as buttons after entering the @ symbol in the recipient address field.

To remove a domain from the list, select it and press the Delete key.

3.7.1

Trigger settings

	PREVIEW		GALLERY		SET	TINGS
CAMERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSIN
TING	Trigger port	u l	Port of additional o	ontroller		
IN	Trigger type usb	~	Type of additional o	ontroller usb *	Does not rele	ase the half-press (usb) 1 0
ENS	Monitor trigger responses 1		Center camera release delay (usb, fre	eze), ms 0	0 10 100	
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GER						
HS						
ING						
Save settings	Take photo		Clear cache			
Save settings	Take photo		Clear cache			
			Clear cache			
	80		Clear cache			
4-28 18:13:27 Start listening 80 4-28 18:13:27 AutoDiscovery:54 4-28 18:13:28 freeze 4-28 18:13:28 Window loaded	80 ervice Listening 8880/UDP		Clear cache			
1-28 18:13:27 Start listening 80 1-28 18:13:27 AutoDiscovery:Si 1-28 18:13:28 freeze 1-28 18:13:28 Window loaded 1-28 18:13:28 BulleTTime starte	80 ervice Listening 8880/UDP d (3.6.0.0)		Clear cache			
1-28 18:13:27 Start listening 80 1-28 18:13:27 AutoDiscovery:5: 1-28 18:13:28 freeze 1-28 18:13:28 Window loaded 1-28 18:13:28 Window loaded 1-28 18:13:29 New license is re 1-28 18:13:22 Camera client coi	80 ervice Listening 8880/UDP d (3.6.0.0) ceived meeted to transfer : Client 2		Clear cache		Date End of Support	01 January 2024
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4-28 18:13-27 Start listening 80 4-28 18:13-27 AutoDiscovery5- 28 18:13-28 Mindow loaded 4-28 18:13-28 Mindow loaded 4-28 18:13-28 Mindow license is tre 4-28 18:13-28 Mindow license is the 4-28 18:13-28 Mindow license is the 4-28 18:13-28 Mindow license is the 4-28 18:13-28 Mindow license is the format of the 4-28 18:13-28 Mindow license is the format of the format of the 4-28 18:13-28 Mindow license is the format of the	80 ervice Listening 8880/UDP d(3.6.0.0) ceived meeted to transfer : Client 2 meeted to transfer : Client 3 meeted to transfer : Client 4 meeted to transfer : Client 6 meeted to transfer : Client 6 meeted to transfer : Client 7 meeted to transfer : Client 7		Clear cache		License is active until * License type	28 May 2023 * License ends at 00:00 Usual
Save settings 4-28 18:13-27 Start listening 80 4-28 18:13-27 AutoDiscovery5-7 4-28 18:13-28 Vindow loaded 4-28 18:	80 ervice Listening 8880/UDP d(3.6.0.0) ceived meeted to transfer : Client 2 meeted to transfer : Client 3 meeted to transfer : Client 4 meeted to transfer : Client 6 meeted to transfer : Client 6 meeted to transfer : Client 7 meeted to transfer : Client 8 meeted to transfer : Client 9 meeted to transfer : Client 9		Clear cache		License is active until * License type Version	28 May 2023 * License ends at 00:00 Usual

"Port of the trigger" - you must select the correct value of the COM port, if you connect a trigger. You can find out the value in the Device Manager.

"Type of trigger" - In this version are available: Dragonfly, Dzen Tech, Esper, usb (without trigger). If you use an incompatible trigger, you must select the usb trigger type. In this case, it is impossible to set the intervals between cameras from the software interface.

"Port of an additional controller" - Here you can select the COM port of an additional trigger that will be used only for receiving commands from it, for example, this trigger with an integrated remote control. If such a controller is not connected, then you must leave the field blank.

"Type of additional controller" - Same as option "Type of trigger". If such a controller is not connected, then it is advisable to select a trigger type different from the type of the connected trigger.

After saving the new value of the type of trigger, you must restart the program!

The option "Center camera release delay (usb, freeze), ms" is intended for using the flash on the central camera to prevent the occurrence of black frames. The recommended value is 10ms. Recommended shutter speed is at least 1/60 s.

			PREVIEW								G	ALLERY						SET	TINGS
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OTING				Trigger port	сом3							Port of ad	ditional o	controller		÷			
AIN				Trigger type	dzentec	h ×						Type of ad	ditional o	controller	usb	~			
EENS			Monitor trigg	er responses	1														
EB																	 		
SER					Tr. 3		Tr. 4		Tr. 5			Tr. 6		Tr. 7		Tr. 8	Tr. 9		
IS	1									1									
ING	2	Z								2									Flash delay (ms)
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"Flash Delay (ms)" - This value is set for output for flash on all Dzen Tech triggers.

"Monitor trigger responses" - Disabling this option disables reconnecting to the trigger when the timeout for receiving a response to the command is exceeded and restarting of the camera clients when the wait time for sending the photo is exceeded.

"Do not release half-press (usb)" - Half-press always remains pressed.

The block with the choice of ports to which the cameras are connected is available when the Dzen Tech trigger is selected. **You must choose the right values for the correct operation!**

The cameras must be connected in the same order as they are listed in the sorting!

Example. You have 3 triggers and 15 cameras. We connect in the first trigger of the camera from 1 to 5 to the corresponding slots from 1 to 5. And so on.

An example of connecting Dzen Tech trigger: https://www.youtube.com/watch?v=7AAAhh YCjo

				PREV	IEW								G	ALLERY							SET	TINGS		
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DTING					Tr	igger por	t							Port of ac	Iditional	controller		÷						
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GER			I r. 1		r . 2		Tr. 3		Tr. 4		Tr. 5			Tr. 6		Tr. 7		Tr. 8	Tr. 9			Order	COM5	сом
HS	1	Ø	0		0		0		0		0	1		0		0		0	0		(1	COM4	
ING	2	V	0		0		0		0		0	2		0		0		0	0		(
	3	Z	0		0		0		0		0	3		0		0		0	0		(
	4	V	0		0		0		0		0	4		0		0		0	0		(
	5	Ø	0		0		0		0		0	5		0		0		0	0		(
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-28 1	8:13:	32 Can		connected	d to transfer d to transfer d to transfer	r : Client 1	10													0.		3.6.0.0 28 April	2022	

When you select the type of trigger - Esper, a window appears with a list of detected triggers. In this window, you must specify the correct order of triggers and the number of cameras on each. Triggers are dragged in the list by the mouse.

To update the list, use the "Find Triggers" button.

If you select a trigger from the list and press the space bar on the keyboard, a light will flash on it, allowing it to be identified.

Esper is the only trigger in which the half-press is active after the shot. With the Esper trigger, the bulb mode in the software interface does not work.

If the port is not marked as used for the camera, then a signal is sent to it with the pause specified in the text field. The value is in ms.

Example. You have 3 triggers and 15 cameras. Connect cameras from 1 to 5 to the first trigger to the corresponding jacks from 1 to 5. Connect the remote controller to the INPUT socket. Connect the LINK of this trigger and the INPUT of the next trigger with the stereo audio cable. In the next trigger connect cameras from 6 to 10 from slot 1-5 and so on. Connect all the triggers to the computer using USB M - USB type C M cables. Sort the triggers in the list, set the number of cameras, save the settings.

An example of connecting Esper Triggerbox trigger: https://www.youtube.com/watch?v=dhHlnY-36qU

3.7.1

Folder location settings

	PRE	VIEW		GALLERY		SET	TINGS
CAM	ERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSING
	Folder for results (photo, vide	20)	C:\Users\yakon\Pictures\	BulleTTime\Result			Browse
	Folder for source photo		C:\Users\yakon\Pictures\	BulleTTime\Source			Browse
REENS WEB	Folder for cached files		C:\Users\yakon\Pictures\	BulleTTime\Cache			Browse
	Folder for audio files		C:\Users\yakon\Music\Bu	illeTTime			Browse
THS F	Folder for intro files		C:\Users\yakon\Videos\B	ulleTTime			Browse
	Folder for Al module		C:\Users\yakon\Downloa	ds\ksuse.ru\BulleTTime\Al3			Browse
F	Folder for PS curves (.acv)		C:\Users\yakon\Pictures\	BulleTTime\Acv			Browse
	Save settings	Taka ni	oto	Clear rache			
	Save settings	Take ph	oto	Clear cache			
-04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18	13:27 Start listening 8080 13:27 AutoDiscovery::Service 13:28 freeze 13:28 Window loaded 13:28 BulleTTime started (3. 13:29 New license is receive 13:32 Camera client connect	e Listening 8880/UDP 6.0.0) d det to transfer : Client 2	oto	Clear cache		Date End of Support	-
-04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18 -04-28 18	13:27 Start listening 8080 (13:27 AutoDiscovery::Service 13:28 Vindow loaded 13:28 BulleTTime started (3) 13:29 New license is receive (13:32 Camera client connect 13:32 Camera client connect 13:32 Camera client connect	e Listening 8880/UDP 6.0.0) d ted to transfer : Client 2 ded to transfer : Client 3 ded to transfer : Client 3	oto	Clear cache		Date End of Support License is active until *	28 May 2023
-04-28 18 -04-28 18	13:27 Start listening 8080 13:27 AutoDiscovery:Service 13:28 Freeze 13:28 Window loaded 13:28 Bulletime started (3J 13:29 New license is receive 13:32 Camera Client connect 13:32 Camera Client connect	Listening 8880/UDP 6.0.0) d ded to transfer : Client 2 ded to transfer : Client 3 ded to transfer : Client 5 ded to transfer : Client 5	oto	Clear cache		License is active until *	28 May 2023 * License ends at 00:00
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04-28 18 04-28 18	13:27 Start listening 8060 13:27 AutoDiscovery-Service 13:28 Window loaded 13:28 Window loaded 13:28 Window loaded 13:22 Camera Cient connect 13:23 Camera Cient connect	t Listening 8880/UDP 6.00) d d to transfer : Client 2 ed to transfer : Client 3 ed to transfer : Client 4 ed to transfer : Client 5 ed to transfer : Client 7 ed to transfer : Client 7 ed to transfer : Client 8 ed to transfer : Client 9 ed to transfer : Client 9 ed to transfer : Client 9	oto	Clear cache		License is active until * License type Version	28 May 2023 * License ends at 00:00 Usual

This window contains a choice of ways to save the results and sources.

In the folder with the final video, Gif, Photo, PhotoPrew subfolders are created that contain: an animated gif with video sizes, a photo from a central camera with video sizes, a photo from a central camera reduced for the gallery.

After saving the new values of the paths, you must restart the program!

Print settings

	PREVIEW			GALLERY		SET	TINGS
CAMERA ORDER	MAIN	- Y	SENDING	ADJUSTMENT	BRANDING	Y	Y
Enable printing ENABLE Print button in Print background coi Automatically print p	lor		Maximum number of co		s reached	1 0 Layout: 2 Quantity width 1 1 Quantity height 1	Size of the sheet Width (mm) 150 Height (mm) 100
NG	Add printer Remove printer	Bu	lizip PDF Printer			Let	
Save settings	Test print	photo		Clear cache		Betwee	
7-07 00:13:08 freeze 7-07 00:13:08 Window loade 7-07 00:13:08 BulleTTime sta 7-07 00:13:09 New license is 7-07 00:13:13 Camera client 7-07 00:13:13 Camera client 7-07 00:13:13 Camera client	::Service Listening 8880/UDP d inted (3.6.1.0)					Date End of Support License is active until *	
7-07 00:13:13 Camera client 7-07 00:13:13 Camera client 7-07 00:13:13 Camera client 7-07 00:13:13 Camera client	d connected to transfer : Client 6 connected to transfer : Client 7 connected to transfer : Client 8 connected to transfer : Client 10 connected to transfer : Client 11						

Photos for printing are selected through the web gallery.

When printing is on, photos are automatically sent to the printers added to the list. Print jobs are sent to each printer in turn. Printers in offline state are skipped.

Do not enable the "Printing enabled" option if printers are currently unavailable!

Attention! Paper size and orientation is defined in the printer settings in Windows! These parameters must be the same on every printer added to the list!

Using the "Margins" and "Layout" settings you can place several photos on one printed sheet.

Margins are not related to margins in printer settings! These are additional indents of the photo from the edge of the sheet.

Margins are configured separately for each printer in the list.

Fields are filled with the color selected in the "Print background color".

By setting the margins in the program, you can eliminate the cropping of the photo by the printer. If the printer cuts the photo, first increase the margins to such a value that they appear on the print, and then reduce them exactly as far as they are visible.

With the help of the option "Offer a choice of the number of prints in the gallery" it is possible to enable the output of the selector of the number of printed copies in the built-in and web galleries. The limitation of the number of copies and the default value are also set here.

When the option "Automatically print photos" is enabled, the photo will be printed in the quantity specified in the "Number of copies by default" immediately after adding to the gallery.

If you enable the option "Block the ability to print in the web gallery when the limit is reached", the print button will disappear from the web gallery if this photo is printed in the quantity specified in the "Maximum number of copies in selection" field.

Window "E-MAIL"

Email Settings Window

PREV	EW/	1	GALLERY	L	SETTIN	
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AMERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSIN
E-MAIL SETTINGS	EMAIL T	EMPLATES	EMAIL DATABASE	SMS SET	TTINGS	SMS DATABASE
Save settings						
	FTP server					
	FTP login					
	FTP password					
u	pload everything to ftp 1					
Upload s	tabilized sources to FTP 1 0					
E	nable sending by email 1					
SM	TP timeout (in seconds) 180					
	Automatically resend 1					
	-					
	Send through SendGrid 1					
5	r's name (for SendGrid) Konstan		••••••	••••••		
	address (for SendGrid) vakonru:					
Sender's ennai	address (for Sendona) yakonra.		eck Sendgrid settings			
			Ok			
		Mailbox: 1 -	F. F.			
	_					
	Is active 1 Sender name Konstant	1 20				
	Smtp port 587					
	Mail server smtp.gm	ail.com				
	Login yakonrus					
	Password •••••			0		
	SSL (TLS) 1					
		Ch	eck mailbox settings			

To send via SendGrid, you need to create an API key in your account and copy it to the program settings.

When the "Upload all to ftp" option is activated, all bullets (center frame, gif, mp4) are forcibly uploaded to ftp without having to click on the "Upload to ftp" button in the gallery.

"Upload stabilized sources to FTP" turns on uploading stabilized sources into the "stab" folder on ftp.

In the folder on the ftp server, you need to create folders: "gif", "mp4", "jpg" and give write permissions. They will load the appropriate file types.

The folders "gif", "mp4", "jpg" and "stab" will be created in the folder on the ftp server. They will load the appropriate file types.

The "Automatic resending" option allows automatic repeated attempts to send messages with the "Error" status. Attention! Sharp increase in traffic volume with unstable internet connection is possible.

When entering the data of several mailboxes, the program will send letters in turn from each. In the absence of a license, sending is done from only one mailbox.

If the "Login" field contains the full email address, then in the "Sender's name" field you can simply enter a display name. If the login is not equal to the e-mail address, then in the field "Sender's name" you must enter the e-mail from which the sending will be made in square brackets. For example: Konstantin <yakonrus@gmail.com>. The specified email must match the account on the mail server.

3.7.1

SSL connection on port 465 is not supported!

Gmail requires you to use a secure app password instead of your account password. To use Gmail, you need to enable two-factor authentication and create an app password: https://myaccount.google.com/signinoptions/two-step-verification https://myaccount.google.com/signinoptions/two-step-verification https://myaccount.google.com/signinoptions/two-step-verification

You must use the generated password in the BulleTTime program instead of the account password.

The "Test the settings" button sends a test email.

Windows "Templates"

PREV	/IEW		GALLERY		SETTI	NGS
CAMERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSING
E-MAIL SETTINGS	EMA	IL TEMPLATES	EMAIL DATABASE	SMS SETT	rings	SMS DATABASE
Export letter template	Import letter templa	te Save emai	il template Additio	nal settings	Template:	
he template is used to send from t	he BulleTTime	 Text of link to agree 	ement			
 Send jpg 	1 0 Send with attachme		"Send" button, I agree to the processing of	personal data.		
0 Send gif	1 0 Files required	Text of agreement				
0 Send mp4	1 0 Insert links to ftp	License Agreemen				
Send RB AI mp4		END-USER LICENS				
Send SM Al mp4		Important - Read	carefully:			
O Show agreement		This End-User Lice	nse Agreement ("EULA") is a legal agreeme	nt between you (either an individua	I or a single entity) and Author of thi	is Software ("Konstantin Kuyukov")
Give consent by default		Text of consent to				
Send without consent		l authorize use on	the website			
O Show consent to use		Mail subject				
Give consent to use by default		Your video in the	attachment!			
ail text						
ello						
ave a good evening! :) our video in attachment est regards, KSuse						
Editor						
Editor 1 🕑 🖿 Paraoraoh	* Times New Roman	× 3 × B ≠ U ▲ ≠ ≡				
	Times New Roman	× <u>3</u> × <u>B</u> ≠ <u>U</u> <u>∧</u> ≠ ≡	■■■に目はは ◎ 2			
	* Times New Roman	×] 3 × B / U ▲ / ₩	■■■目目はは ◎⊠			
	Y Times New Roman	× 3 × B / ∐ ▲ / ₩	₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩			
	* Times New Roman	× 3 × B / ¥▲ # ₩	말을 하였던 가 안 데 의 물 문 문			
	" Times New Roman	× 3 × B / ∐ ▲ / ₩	**#EE## ©9			
	* Times New Roman	× 3 × 0 / ∐ ▲ / ₩	■■■に注かけ ◎ ₪			

If FTP is enabled, then in the text of the letter {photo}, {video}, {gif} are replaced with the corresponding download links.

It is possible to obtain two consents from the user. The first of these can be made mandatory.

The template selects the types of files that will be attached to the email, as well as the obligatory presence of them.

Thus, for example, you can choose that the email will contain a video processed using AI, and display a regular video in the web gallery. Guests will select a video in the web gallery and send it to their mailbox. But the email will be sent only after the readiness of such a video (which is especially important for weak computers).

Emails are sent using the template selected on this page.

The template has the ability to enable / disable the attachment of files to the email.

Auto replace tags:

{InternetGalleryLink} - link to the Internet gallery

{InternetGalleryPhotoLink} - link to the file in the Internet gallery

Window "Additional Settings"

CAMERA ORDER MAIN SENDING ADJUSTMENT BRANDING INTERNET GALLERY POST-PRO E-MAIL SETTINGS EMAIL TEMPLATES EMAIL DATABASE SMS SETTINGS SMS DATABASE Export letter template Import letter template Save email template Additional settings Template: 1 Import letter template Import letter template Import letter template Template: 1 Import letter template Impo		PREVIEW						GA	LLERY					5	ETTING	SS	
Export letter template Import letter template Save email template Additional settings Template: 1 Import letter template het template is used to send from the BulleTime Tent of link to aurorement 0 Send gpd Import letter template Tent of link to aurorement 0 Send gpd Import letter template Tent of link to aurorement 0 Send gpd Import letter template Tent of link to aurorement 0 Send gpd Import letter template Tent of link to aurorement 0 Send gpd Import letter template Import letter template Import letter template 0 Send gpd mpd Import letter template Import letter template Import letter template Import letter template 0 Send gpd mpd Import letter template 0 Send gpd mpd Import letter template Import letter template Import letter template Import letter template 0 Send gpd mpd Import letter template Import letter template Import letter template Import letter template 0	CAMERA ORDER	1	MAIN			SENDING		ADJU	ISTMENT	T	BRA	NDING	Ĩ	INTERNET GALL	ERY	POST-PRO	CESSING
	E-MAIL SETTING	s	J	EM	AIL TEMPLATE	s	Ĺ	EMAIL	DATABASE	Ĩ		S	MS SETTINGS	I		SMS DATABAS	
 Send jpg Send jpg<	Export letter template		Impo	rt letter temp	olate	s	Save email te	emplate	Add	litional setti	ngs			Template:	1		
Control Share	Send jpg Send gif Send mp4	C Additional settings		Print?					ize (ps) Stroke color	indent left ind	ent right		1				
0 Show consent to use Image: 1 to 1 t	 Show agreement Give consent by defa 	ID	1 0	1 0	Arial -	Regular	14							ingle entity) and Auth	or of this S	oftware ("Konstantin	Kuyukov")
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In this window, you can choose which additional data entry fields to display in the web gallery.

The collected data is contained in the exported xls file.

It is also possible to turn on printing of the entered data on photos choosing the position, font, and color of labels.

Additional fields can be renamed and made mandatory.



Database window

	PRE	VIEW						GALLERY				SETTIN	GS	
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E	-MAIL SETTINGS	I	EMA	IL TEMPLA	ATES		I	EMAIL DATABASE	Í	SMS S	ETTINGS	I	SMS DATABASE	
	Send all		1	٥	1	0		2023-04-17	2023-	04-17	Export to xis		Delete all	
	Date, time	Email			A I	JT			Status	Description				
Send	2023-04-17 11:37:5	5 yakonrus@gmai	l.com		0 0	1	1 20	230417_110235_0001	Sent	ОК			×	

In this window, you can see the status of all sent letters in the selected date range and resend if necessary.

You can delete an error line by selecting and pressing the Delete key.

The width of the columns can be changed by moving the separators in the table header.

The "Send All" button re-sends all emails for the specified date interval except those already sent. While holding down the Shift key, all messages are resent, including those successfully sent.

In the table you can change the email address of the recipient and the number of the template.

"A" - whether consent was given to the processing of personal data

"U" - was consent to the use of the video given

"T" - letter template number

"M" - mailbox number

Black number - total emails

White number - sending

Green number - sent

Red number – errors

3.7.1

"SMS" settings window

		Υ		Ϋ́		
PREV	/IEW		GALLERY		SETTIN	GS
CAMERA ORDER	MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSING
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PREV	/IEW		GALLERY		SETTIN	GS

PREVIEW		1	GALLERY			SETTINGS			
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			2023-04-17	2023-04-17	E	xport to xis	Delete all		
te, time Phone number	A L	Name							
, time Phone number		Nume							

Additional text boxes and consent checkmarks appear in the galleries according to the selected email template, even if email is turned off.

Attention! There is no integration with sending services. Designed only to collect phone numbers for manual sending.

Adjustment settings window

	e BulleTTir		8	Υ		Υ		
		PREVIEW			GALLERY		SETTING	iS
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2 0	248	398 248	1500					
3 0	248 248	398 248 398 248	1500					
	248 248	398 248 398 248	1500					
4 0 5 0		398 248	1500					
	248	530 Z40						
5 0		398 248	1500					
5 0 6 0	248		1500 1500 1500					

It is used to configure the adjustment of the cameras.

Calibration diodes are always located strictly perpendicular to the plane of the cameras.

Before starting the calibration, you must make sure that the center of the frame of each camera coincides with the calibration pole and each camera is correctly focused.

"Reset calibration" - Reset all calibration settings.

The picture for calibration needs to be shot only from this window by clicking on "Take Photo", when switching to another tab image in memory is destroyed.

It is possible to take a photo both simultaneously for all cameras and at a selected interval.

Clicking on the camera in the list below you can see the result image.

"Check coordinates" - Starts the search for markers in the picture. Serves to verify the correctness of their detection.

"Calibrate" - Automatic calibration by markers.

The algorithm searches for two brightest or darkest points or similar colors in the specified search zones.

As the coordinate of a point, the center of the spot is determined, which consists of all points corresponding to the parameter "Max. deviation".

It is recommended to calibrate in M mode without compression.

If the calibration is unsuccessful, then you should interrupt the calibration, click "Reset calibration", check if all cameras are aligned, if there are other light sources in the search zones, change the brightness, take a slightly darker or lighter frame and calibrate again.

"Set offset by Y" is used to offset the aligned images in height relative to the found center. It is necessary, for example, if the cameras have different installation heights. The value is set as a percentage of the distance between the diodes.

See the "Standard calibration procedure" section for a complete description of the calibration process and video.

Manual calibration possible.

To do this, mark the upper calibration point (convergence point of cameras) on all photos with the left mouse button, and the lower point with the right button.

To record the values of the current position of the mouse cursor in coordinates, you can use hot keys: number 1 - for the top point and number 2 - for the bottom point.

Then click the "Align" button.

Example: <u>https://www.youtube.com/watch?v=sAPTe-LfEjI</u>

Adjusting White Balance, Exposure and Calibration: <u>https://youtu.be/Y50nzJJ1_JM</u>

It is possible to make a backup copy of the calibration parameters and restore them back.

There is an automatic calibration correction function. It is necessary to take a photo of a clean background after calibration. Then, if necessary, you can correct the calibration using this pattern. Video instruction: <u>https://youtu.be/qjYPEP4Stb8</u>

"Make pattern" - save the shot as a template

"Align to pattern" - fix the calibration according to the template

"Reset the alignment" - return the values of the original calibration

Branding settings window

Static Make a video with SM Al Capacity 100 Z Capacity 100 Capacity 100 Z Capacity 100 Z Capacity 100 Capa	PREV	VIEW		GALLERY		SETTINGS	5
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PropyNeer * Contrast (w) Code Settings into Audo Make a photo of the scene Export as Vigit Ear • <t< td=""><td>Test EmptyVA</td><td>lse for photo</td><td>Video (without cycle)</td><td></td><td></td><td>Scale 0,1140234</td><td>×1</td></t<>	Test EmptyVA	lse for photo	Video (without cycle)			Scale 0,1140234	×1
Night Rear 0 Suturation (%) New Additeter Image: Curves New 12 Image: Curves New 23-3 Image: Curves New 23-3 Image: Curves Image: Curves Image: Curves Image: Curves </td <td></td> <td>ontrast (%)</td> <td>Codec Settings</td> <td>Intro</td> <td>Audio</td> <td>Make a photo of the scene</td> <td>Export sample</td>		ontrast (%)	Codec Settings	Intro	Audio	Make a photo of the scene	Export sample
	New32-13 Counter32-13					10000	3.2 Top, %

This window creates a set of presets for video branding.

For each preset, you can select the aspect ratio of the frame, frame size, video encoding bit rate, title, additional framing of the source, deletion of background, brightness and contrast correction.

In the "Preview" window, a choice is made among presets for which the "Enabled" option is enabled. After turning on / off a preset, you do not need to save it unless you made changes to other options.

To brand the printout, use the "Use for Printing" option. Only one of the presets can have the status "Enabled for printing".

"Use AI Slow Motion" - This option appears after installing AI. To work, you need a 4GB or more nvidia video card. In this mode, virtual cameras are created, in the amount of (N - 1) * 30 / fps + 1, where N is the number of real cameras.

When using AI Slow Motion, the number of virtual cameras will depend on the set fps value. It is necessary to edit and save the presets that will be used in this mode.

The option "Add prefix" adds the name of a preset to the names of photos and videos.

"Brightness", "Contrast", "Saturation" options increases these video parameters by the specified number of percent.

The "Unsharp" option allows you to sharpen the image.

It is possible to color correct the final mp4 using the selected PS Curves preset (.acv). The dropdown list displays all files located in the folder specified in the main settings.

"Number of turns" sets the minimum number of rotation cycles in the final video. With this option you can set the duration of the video.

"Color of transition" - Color of flash in transition from video to bullet in "video + bullet" and "video + bullet + video" modes.

Video codec settings are set using the "Codec Settings" button. It is recommended that you select "High" quality and one-pass encoding.

Crop setup example: <u>https://www.youtube.com/watch?v=Xjbl0gDxN3w</u>

The red rectangle is the crop rectangle.

The orange rectangle is the visibility area used when removing the background. Everything that is outside the visibility zone becomes transparent and is replaced by a background image.

The blue rectangle is the insertion area of the original image. Can be used to downsize and move objects in the frame while removing the background.

Moving of the current layer carried out by the left mouse button.

You can use the mouse wheel to scale on the current layer.

The left mouse button while holding down the Shift key moves the crop rectangle.

The left mouse button while holding down the Ctrl key shifts the crop border. When you click in the upper quarter of the frame - the upper border, in the lower quarter - the lower border, in the right quarter - the right border, in the left quarter - the left border.

The left mouse button while holding down the Shift + Alt keys moves the visibility area rectangle.

The left mouse button while holding down the Ctrl + Alt keys shifts the visibility zone border. When you click in the upper quarter of the frame - the upper border, in the lower quarter - the lower border, in the right quarter - the right border, in the left quarter - the left border.

The left mouse button while holding down the Ctrl + Alt + Shift keys moves the rectangle of the insertion area of the source image.

When you change the cropping rectangle, the insertion area of the original image automatically becomes equal to it.

To apply the settings, you must save the preset!

When the shooting mode for posting, "Number of turns" is set, the number of turns of the bullet between the videos in the "video+bullet" mode and the minimum number of turns in "freeze" and "boomerang" modes are set, but not less than 3 seconds.

Preset graphics are customizable by adding layers: text layers, image layers, 3D graphics layers, and video layers.

For each layer, you can adjust the opacity parameter (individual for each angle, for example, you can simulate the appearance of a logo during rotation) and Z (the layer layout on the axis connecting the center of the rotation and the camera lens. Z = 0 - the center of rotation).

The slider of the opacity of the layer, while holding down the Ctrl key, changes the transparency of the layer in all cameras at once.

Static - the same object in every view.

Automatic rotation about the center - Transformation of the object in each angle relative to the center of rotation.

Automatic rotation relative to the object - Transformation of the object at each angle relative to the center of the object.

Sequence (looped) - An images have been prepared for each view in advance (preliminary render). The files must be named Name_X.png, where X is the camera index. The index of the first camera is always 0, that is, the sequence numbering must start from 0.

Layers overlap in the order in the list.

Moving the current layer is done with the left mouse button, or by changing the values of the "X", "Y" fields.

You can scale the current layer using the mouse wheel.

If none of the presets is set to "Use for printing", then the photo is printed as it was taken in a 3: 2 aspect ratio.

If you want to brand a photo, then you must enable "Use for print" for the selected preset. Select the required aspect ratio from the list of sizes. It is desirable to choose a larger size, since this affects the drawing of the overlayed graphics.

You do not need to make this preset active, otherwise it will appear in the list of presets for shooting in the main interface.

The "Reset" button sets the crop margins to 0.

The "Add" button increases the crop margin by the specified value. The value can be negative, then the margins decrease.

After making any changes, you must save the preset!

When you click on "Save Preset", the program creates a set of png files that will be used when processing photos.

It is possible to create branding for an arbitrary number of cameras. To do this, select the required number of cameras in the drop-down list. By default, as many cameras are displayed as there were connected to the system during the last save of the program settings.

When you click on the "Make a photo of the scene" button, photos is taken and the images are saved for presets.

To facilitate cropping, you can select a background color. When processing a photograph, areas outside the original photograph will be painted in the specified color.

Clicking on "Export sample" creates a video with the current preset based on the saved frames. The finished video will be added to the gallery.

To do this, you need to enable the use of this AI, and then save a snapshot of a clean background.

https://youtu.be/2zF8fqCAEWc

With the help of the RGB sliders, it is possible to perform color correction by boosting or attenuating the corresponding channel.

The settings "Radius (mm)", "Distance (mm)", "Angle of view (horizontal)" are set according to your setting and affect the rendering of images with the modes "Auto rotation about center", "Auto rotation about object", as well as rendering layers with 3D graphics (.obj).

"Radius (mm)" - the distance from the camera to the convergence point

"Distance (mm)" - the distance between the optical axes of cameras

"Angle of view (horizontal)" - Horizontal angle of view of the lens (can be found in Wikipedia)

You can create separate presets for use when printing photos and for photos that will be attached to emails.

Attention! Image correction options (brightness, contrast, saturation, curves, RGB) are not used to process these photos.

If for some reason you need to rotate the final video, you can use the buttons at the bottom of the window. Rotation applies to the entire video, including overlay graphics, except for intro and video overlay.

If you are using not a classic horizontal bullettime, but a vertical one, then in order to calibrate it you need to use not a vertical, but a horizontal calibration pole. The cameras in sorting must be rotated by 90 degrees, since the calibration algorithm requires a vertical arrangement of diodes. And then the final video needs to be rotated 90 degrees in the opposite direction.

Image layer

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	Layer Type Index 2 1 map: 0 5 Text 1 6 L3D 2 7 Video 4 6 7 8 9 10 10 1 1 1 1 1 1 1 1 1 1 1 1 1	Reset	ВЫБС	DP 3BË3	Turning the final video o	17,744793 4:5 0 Add 9:16 Background

If "overlay" is selected, the image is superimposed over the one received from the camera. If "background", then it is placed instead of the removed background.

If you use auto-rotation of the image, then to increase the effect, you can reduce the installation radius or increase the distance between the cameras.

"Background Generator" - allows you to create a sequence from the selected image: <u>https://youtu.be/Y6V6b-nyGqk</u>

Video layer

KSuse BulleTTime					- 🗖 X
PREVIEW		GALLERY	J	SETTING	is
CAMERA ORDER MAIN	SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSING
Image: Name Name 1 Name 1 Name 1 Is active 1 Is active 1 Is active 1 Is active 1 Use for photo 1 Use for photo 1 EmptyNack	Static Auto-rotate (center) Auto-rotate (object) Sequence (looped) Background generator Video (without cycle)	Make a video with SM AI Remove background Hide photo Radius (mm) Distance (mm) Angle of view (horizontal)	1 0 Soverlay 2800 Background	bpacity 100 z 0 Src WVAKONHOMEVAE_templates&Fo Screen i & Color Blur of edges Opacity	Ctages/Export/vain1 Browse
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.mp4 and .mov import supported.

FPS video should be 30!

The video must be longer than the length of the final video!

Currently only one video layer is used.

This video is overlayed on top of all of the final video without looping. It fits within the dimensions of the final video. Zoom and position cannot be adjusted.

Blending is done using the Blend mechanism: Screen - resulting in brighter pixels of the video and overlay Transparent - overlay with alpha blending Color - the specified color is replaced with transparent

In the case of using color keying, the degree of blurring of the edges and the transparency of the video are additionally indicated.

Text layer

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Ð		Static Auto-rotate (center) Auto-rotate (object)	Make a video with SN Remove backgroi			z 0	x 408,	9545
Name	Name Test	Sequence (looped)	Hide ph	oto 1 0	⊖ Italic		Y 57,0	7792
Empty Test EmptyVA EmptyVA2	1 0 Use for print 1 0 Use for photo 0 Brightness (%)	 Background generator Video (without cycle) 	Radius (n Distance (n Angle of view (horizor		 Bold Text color Text 	* BulleTTime	Font size (em) 40 Font Arial	
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Counter32-13 Counter32-5 960x960 1280x1280 1 2 3:2 70mm	R 0 C C C C C C C C C C C C C C C C C C							,945314 Bottom, ,289061 Left, % 7,744793 Right, 9 7,744793

Compatible models are in the format .obj

Lights in the model are ignored.

The model is lighted by three light sources. Brighter in the center of the installation and two weaker at the edges. The total brightness is set by a slider or by entering a text value.

It is quite difficult to see the 3D model in the preview window.

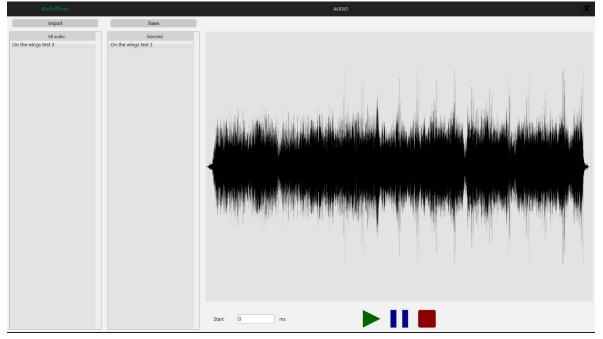
Model can be located far beyond the window.

It is recommended to set the origin in the center of the model in advance.

To increase the effect, you can reduce the installation radius or increase the distance between the cameras.

It is highly recommended that you use pre-render instead of models.

Audio editor



In this window it is possible to import audio files in mp3 and wav formats. The audio files that will be used in the preset are dragged by mouse into the "Selected" column. For each track, you can set the starting position (the sound will start with the selected ms). After selecting the tunes and setting the beginning, you must click the "Save" button.

One of the selected melodies will be randomly inserted into the video.

Intro

BulleTTime				NTRO	X
Import	Save	 Before 	○ After		
All video	Selected	^			
		~			

In this window it is possible to import video files in mp4 format. The video that will be used in the preset as an intro is dragged with the mouse into the "Selected" column. After selecting, you must click "Save".

You can set whether the intro is inserted before or after the main video.

Internet Gallery settings window

Preset 27 -		SENDING	ADJUSTMENT	BRANDING	INTERNET GALLERY	POST-PROCESSIN
Preset 27 v						
		Is active	1 0			
		Synchronize gallery	1 0		Export QR code of gallery	
		Upload a photo	1 0			
		Upload a video	1 0			
		Upload a RB Al video	1 0			
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		Upload a gif	1 0			
		URL	https://btg.ksuse.ru/			
		Synchronization password	•••••			O
		Show gallery	1 0		Show QR code of gallery 1 0	
		Password for the gallery	1 📕 0		Show QR code of file 1 0	
		Access password	•••••			0
	Access to t	he entire gallery with an individual pin code	1 0			
	Enable sending 1					
	Show button 1			Sender name	Konstantin	
	Mail server smtp.gr	mail.com		Login	yakonrus@gmail.com	
	Smtp port 587			Password	•••••	0
			Test the settings			
			Ok			

In this tab, enter the website address for the online version and the synchronization password.

The online gallery runs in php 7.2 and later. The content is loaded via ajax using the jquery library without refreshing the page, which allows you to embed the gallery into almost any of your pages.

You need copy the files from the "for_site" folder to the site. These files must correspond to the version of the program from which the gallery is synchronized.

You must set the Data folder to have permission 0777.

The pass.php file stores the sync password.

The dictionary.php contains the online gallery dictionary.

Attention! You cannot sync one gallery from different copies of the program! Synchronization is one-way, one Sender will hide files uploaded by another Sender.

"Show gallery" - enables displaying the entire gallery.

"Password for access" - sets a password for viewing the gallery.

A shot is always available using a pin-code regardless of the gallery settings.

With the "Access to the entire gallery with an individual pin-code", you can display the entire gallery, if you know the pin-code for any of the pictures. In fact, these are individual passwords

for the gallery. That is, if you delete someone's picture from the gallery, then the person automatically loses access to the entire gallery.

The online gallery has a button "Send email".

If you make e-mail settings on this page, then sending will be carried out through the specified mailbox. The email will contain the selected file as an attachment. The email template is selected in the "E-mail"-"Templates" tab.

Attaching images to html text is not supported. Use links to external sites.

If the data is not filled in, then the button will simply call the default email program on the device used and insert a link into the text of the email.

Bulle∏ime

Post-processing window

PR	EVIEW		GALLERY		SETTINGS			
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20110617_003957_0033	2010617_201101_0034	20/10617_201120_0035	26210617_201146_0036	20110617_201210_0037	20/10/17_201226_008	20210617_201254_0099		
20210617_201311_0040	2010017_20141_6042							

	PREVIEW		GA	LLERY		SETTINGS	
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ust)							
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	20210617_140841_0000	0	0	0	Make a video	Make a video with SM AI	
	20210617_141136_0001	0	0	0	Make a video	Make a video with SM AI	
	20210617_141220_0002	0	0	0	Make a video	Make a video with SM AI	
	20210617 141249 0003	0	0	0	Make a video	Make a video with SM AI	
	20210617_141313_0004	0	0	0	Make a video	Make a video with SM AI	
	20210617_141921_0005	0	0	0	Make a video	Make a video with SM AI	
	20210617_142818_0006	0	0	0	Make a video	Make a video with SM AI	
	20210617_150134_0007	0	0	0	Make a video	Make a video with SM AI	
	20210617_151915_0008	0	0	0	Make a video	Make a video with SM AI	
	20210617_152014_0009	0	0	0	Make a video	Make a video with SM AI	
	20210617_152042_0010	0	0	0	Make a video	Make a video with SM AI	
	20210617_152314_0011	0	0	0	Make a video	Make a video with SM AI	
	20210617_152357_0012	0	0	0	Make a video	Make a video with SM AI	
	20210617_152457_0013	0	0	0	Make a video	Make a video with SM AI	
	20210617_152550_0014	0	0	0	Make a video	Make a video with SM AI	
	20210617_152643_0015	0	0	0	Make a video	Make a video with SM AI	
	20210617_152717_0016	0	0	0	Make a video	Make a video with SM AI	
	20210617_152759_0017	0	0	0	Make a video	Make a video with SM AI	
	20210617_153223_0018	0	0	0	Make a video	Make a video with SM AI	
	20210617_153242_0019	0	0	0	Make a video	Make a video with SM AI	
	20210617_153404_0020	0	0	0	Make a video	Make a video with SM AI	
	20210617_153429_0021	0	0	0	Make a video	Make a video with SM AI	
	20210617_153524_0022	0	0	0	Make a video	Make a video with SM AI	
	20210617_153555_0023	0	0	0	Make a video	Make a video with SM AI	

This tab displays a list of all saved stabilized sources. The list is limited by time of creation / modify as well as videos in galleries.

In this window, the same filter by creation time is applied as in the galleries.

You can create a new video using any other preset and also apply AI Slow Motion.

If you select "Replace old video", the new video will replace the old one in the gallery and can be sent with emails in accordance with the existing records in the database.

Tutorial: https://www.youtube.com/watch?v=SIMVh01 js8

Standard calibration procedure

- 1. Initial setup: turn on the cameras, set all cameras on the calibration pole (align center of the frame on the pole, adjust the focus).
- 2. Check if all cameras are responding to the remote control. It is important! If autofocus is on and the lighting is bad, then during this test, focus may be lost.
- 3. Settings in the program: check that AF lock is turned on (applies only to a number of models; if the option does not work on your camera, then you need to disable autofocus with the switch on the lens), check the order of the cameras, take a shot. From the first image, it will become clear whether all cameras are sending a photo, whether the focus is set correctly everywhere, and whether there are other light sources in the search areas.
- Set up search zones for marker/diodes (search zones are common for all angles) in the "Camera order" menu using Live View, as well as ISO, aperture, shutter speed to accurately identify diodes.
- 5. Go to calibration, click "Reset all", "Take photo"
- 6. When the indicator turns green, click on any of the cameras in the list. Check out full size image.
- 7. "Check the coordinates". Make sure that all the LEDs are correctly defined. The red crosshair should coincide with the center of the upper diode in all angles.
- 8. If suddenly the indicator does not turn green or the previews are lost on the second monitor on any of the last 2 steps, then you need to exit calibration and check the status of cameras. Then start the calibration procedure again.
- 9. Press "Calibrate " and wait.
- 10. "Take photo", wait for the video on the second monitor, if the diodes continue to jump, then go to step 3.

Recording the calibration process and setting framing in branding:

https://www.youtube.com/watch?v=BCDRiGaBMr0

https://www.youtube.com/watch?v=Xjbl0gDxN3w

https://youtu.be/6ORsJneiVrA

Full reboot procedure

- 1. Shut down KSuse BulleTTime.
- 2. De-energize the installation (cameras, usb hubs, trigger).
- 3. Disconnect the usb cable from the laptop (going to the installation).
- 4. Wait 30 seconds.
- 5. Power up the usb hubs.
- 6. Connect the usb cable to the laptop.
- 7. Power up the installation.
- 8. Launch the software.

Bulle∏ime

Hotkeys

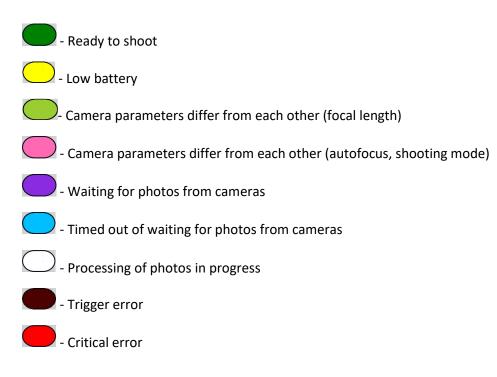
- C, V, PageUp preparation for shooting (half press)
- D, F, PageUp cancel preparation for shooting (release the button)
- Enter, space, PageDown shutter release (full press)
- 1 uniform boomerang
- 2 boomerang with a slowdown
- 3 boomerang with acceleration
- \circ 4 boomerang with a slowdown to the center
- \circ 5 boomerang with acceleration to the center
- o 8 video + bullet + video
- o 9 video + bullet
- o 0 freeze
- \circ --reduction of the interval in the boomerang
- + increase the interval in the boomerang
- Ctrl + H hide video
- Ctrl + D delete video
- Ctrl + S upload to ftp

Program activation

Attention! The program is tied to the computer. One license is valid for one computer.

License management is carried out through KSuse Manager.

Indicator colors



Possible problems and their solution

The list of cameras is empty	Check the connection of the usb cable
The red indicator in the software interface	 Go to Settings - Order. Check that there are all cameras in the list of cameras, all display a BodyID and
	have a sequence number different from 1000.
	There is no caption: "Incorrect number of cameras in the trigger settings".
	4. The caption: "Must be X cams" is green.
Caption: "Incorrect number of cameras in the trigger settings"	 Check that the number of cameras in the list corresponds to the number of connected.
	2. Go to Settings - Main.
	3. Install the number of cameras
	connected to each trigger.
The caption: "Must be X cams" is red.	1. Check that the number of cameras in the
	list corresponds to the number of
	connected.
	2. Click save settings.
Black indicator	1. Go to Settings - Main.
	 Check the trigger settings (port number, type).
	3. Restart the software.
	4. Perform a full reboot procedure if the
	previous steps did not help.
Black indicator	1. Perform a full reboot procedure
After the shutters are released, the	1. Check that all cameras take a picture
"purple" indicator	(turn on the displays on all cameras,
	take a picture, everyone should blink).
	 Click "Reconnect" in Settings – Camera order.

	3. Click "Reset power", wait until all
	cameras are connected to the OS
	(Windows will stop making
	disconnecting sounds, connecting the
	device), and click "Reconnect".
Did not receive a email	1. Open Settings - Database
	2. Find the line with the entered address
	and frame number.
	3. Check that the address is correct.
	4. If the line is green, then ask to check the
	Spam folder of the mailbox.
	5. If the line is red, then try to send again
	by clicking on the "Send" button.

Used libraries

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System.Data.SQLite - https://system.data.sqlite.org Microsoft - <u>https://dotnet.microsoft.com/</u>

The MIT License:

DynamicExpresso.Core - https://github.com/davideicardi/DynamicExpresso

FluentFTP - https://github.com/robinrodricks/FluentFTP

GifMotion - https://github.com/warrengalyen/GifMotion

HelixToolkit - https://github.com/helix-toolkit/helix-toolkit

Newtonsoft.Json - https://www.newtonsoft.com/json

Portable.BouncyCastle - https://www.bouncycastle.org/csharp/

SendGrid - https://sendgrid.com/

SharpDX - <u>http://sharpdx.org/</u>

SharpZipLib - https://github.com/icsharpcode/SharpZipLib

starkbank-ecdsa - https://github.com/starkbank/ecdsa-dotnet

WriteableBitmapEx - <u>https://github.com/reneschulte/WriteableBitmapEx</u>

QRCoder - https://github.com/codebude/QRCoder/

QRCode.js - https://github.com/davidshimjs/qrcodejs

jQuery - https://jquery.com/

Super-SloMo https://github.com/avinashpaliwal/Super-SloMo

Named Pipe Wrapper - https://github.com/acdvorak/named-pipe-wrapper

Apache License: CalcBinding - <u>https://github.com/Alex141/CalcBinding</u> Magick.NET - <u>https://github.com/dlemstra/Magick.NET</u> NPOI - <u>https://github.com/tonyqus/npoi</u> Google.Apis.Drive.v3 - <u>https://github.com/googleapis/google-api-dotnet-client</u> OpenCvSharp4 - <u>https://github.com/shimat/opencvsharp</u> U²-Net - <u>https://github.com/xuebinqin/U-2-Net</u> Real-time 2D Multi-Person Pose Estimation on CPU: Lightweight OpenPose -<u>https://github.com/Daniil-Osokin/lightweight-human-pose-estimation.pytorch</u> SixLabors.ImageSharp - <u>https://github.com/SixLabors/ImageSharp</u>

Microsoft Public License (Ms-PL):

DotNetZip - <u>https://github.com/haf/DotNetZip.Semverd</u> Extended.Wpf.Toolkit - <u>https://github.com/xceedsoftware/wpftoolkit</u> NAudio - <u>https://github.com/naudio/NAudio</u>

BSD 3-Clause License:

NLog - <u>https://nlog-project.org/</u>

PyTorch - <u>https://pytorch.org/</u>

Numpy - <u>https://numpy.org</u>

PSF LICENSE: Python - https://www.python.org/

HPND License: Pillow - <u>https://github.com/python-pillow/Pillow/</u>

LGPL v3: FFMPEG - <u>https://www.ffmpeg.org/</u>

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