

***KSuse***  
***BulleTTime***  
***SOFTWARE***

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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 7 SP1 x64, 8.1 x64, 10 x64, Canon cameras:

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 (8<sup>th</sup> Gen and above), i7 (4 or more cores), SSD, at least 8GB of RAM.

Required software:

1. .NET Framework 4.7.2. <https://dotnet.microsoft.com/download/dotnet-framework-runtime>
2. Codec x264. Recommended K-Lite Codec Pack Mega.  
[https://codecguide.com/download\\_kl.htm](https://codecguide.com/download_kl.htm)

Additional software (may need to be installed):

1. Microsoft Visual C ++ 2015 Update 3 redistributable component (both x86 and x64 versions): <https://www.microsoft.com/en-us/download/details.aspx?id=53587>

## 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.

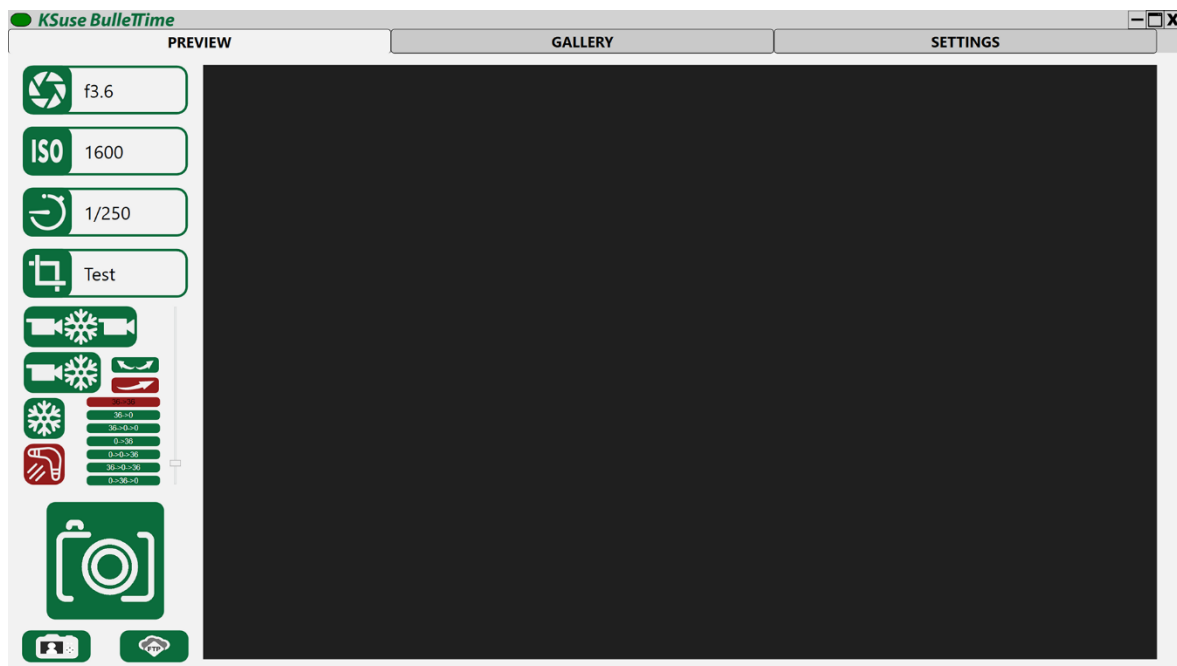
## Description of the program interface

View window (on the second monitor)



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 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 (if there is a programmable trigger, for example, Dzen Tech). 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 more often than once second.

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

The lowest 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 selection of the main preset is made by clicking the left mouse button. Selecting an additional preset is done with the right mouse button. Deselecting an additional preset is done by clicking the right mouse button again.

An additional preset is used to generate an additional video simultaneously with the main video, for example, without logos, so that it can be used in editing.

Attention! Framing and stabilization of frames is carried out according to the settings of the main preset. The additional preset must have the same aspect ratio as the main one. Imposition of sounds on the secondary video is not carried out.

The slider is used to set the delay between camera shots in boomerang mode.

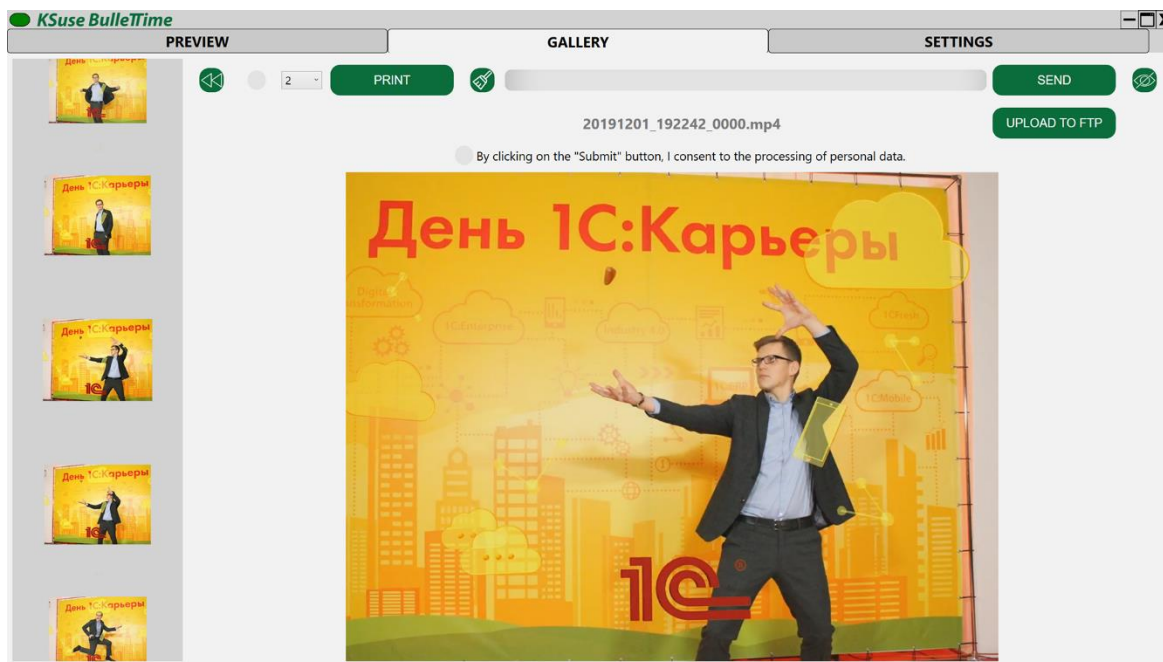
For boomerang, there are 5 modes: uniform, with deceleration, with acceleration, with deceleration towards the center, with acceleration towards the center.

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  - 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.

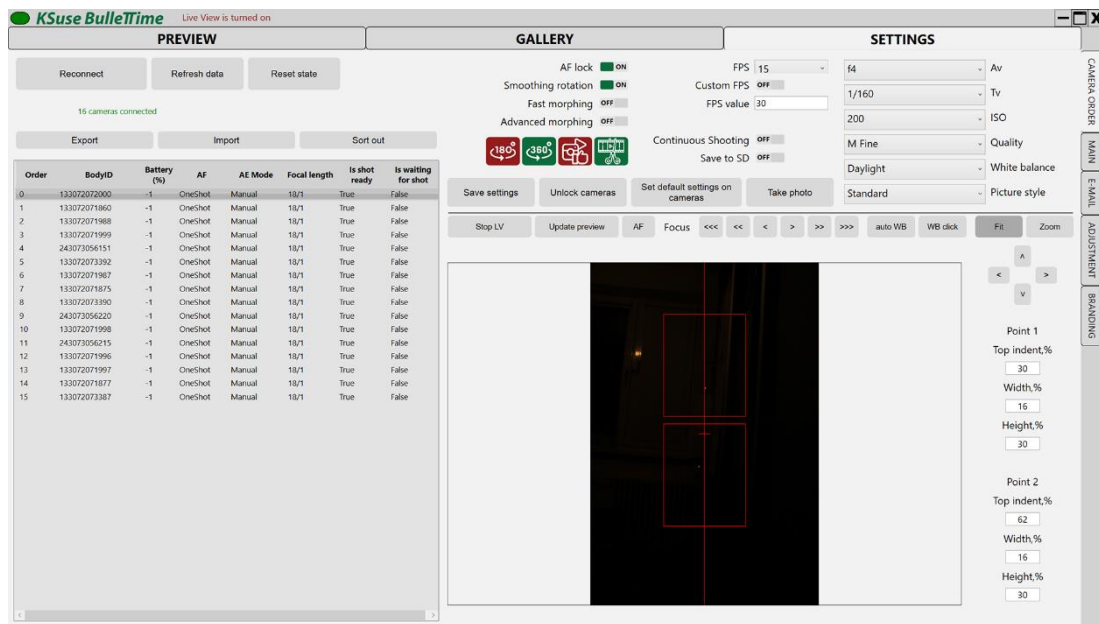


On any device connected to the same network as a computer with BulleTTime software, you must open any browser and enter the IP address of the computer with BulleTTime software in the address bar.

The web gallery and carousel addresses are displayed in the “Settings – Send”.

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.

## Sort settings window



**After changing the order of cameras or software operation mode, you must click “Save Settings” before switching to another window or starting shooting!**

To automatically determine the position of the cameras (horizontal or vertical), you must take a photo in the “freeze” mode before using Live View, “live mirror” or “video+bullet”.

Setting the order of the cameras (the order of gluing frames) is done by dragging them with the mouse. 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" button.
2. Press the shutter button on each camera in right order.
3. Save settings.
4. Click the "Sort" button.

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.

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.

“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.

“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”.

“Lock AF” - Programatically autofocus lock. It is recommended to include it only when you use “half-pressing”. 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. Software AF lock and burst mode can be applied to the following models: 1500D, 2000D, Rebel T7, Kiss X90, 3000D, 4000D, Rebel T100, 200D, Rebel SL2, Kiss X9. 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.

“Rotation smoothing” - Adds duplication of last frames for a smoother rotation.

“Quick morphing” - Instead of duplicating frames, adjacent frames overlap each other. Virtual cameras / views are added. Unfortunately, it looks like motion with a slow shutter speed.

“Advanced morphing” - Intermediate frames are created based on motion analysis. Unfortunately, a good result is obtained only with a uniform background.



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



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



- The minimum duration is equal to 4 seconds.



- In the video exactly one pass for easy editing.

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>

**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.

"Fit" shows a preview of the entire frame.

"Zoom" enlarges 1/10 frame.

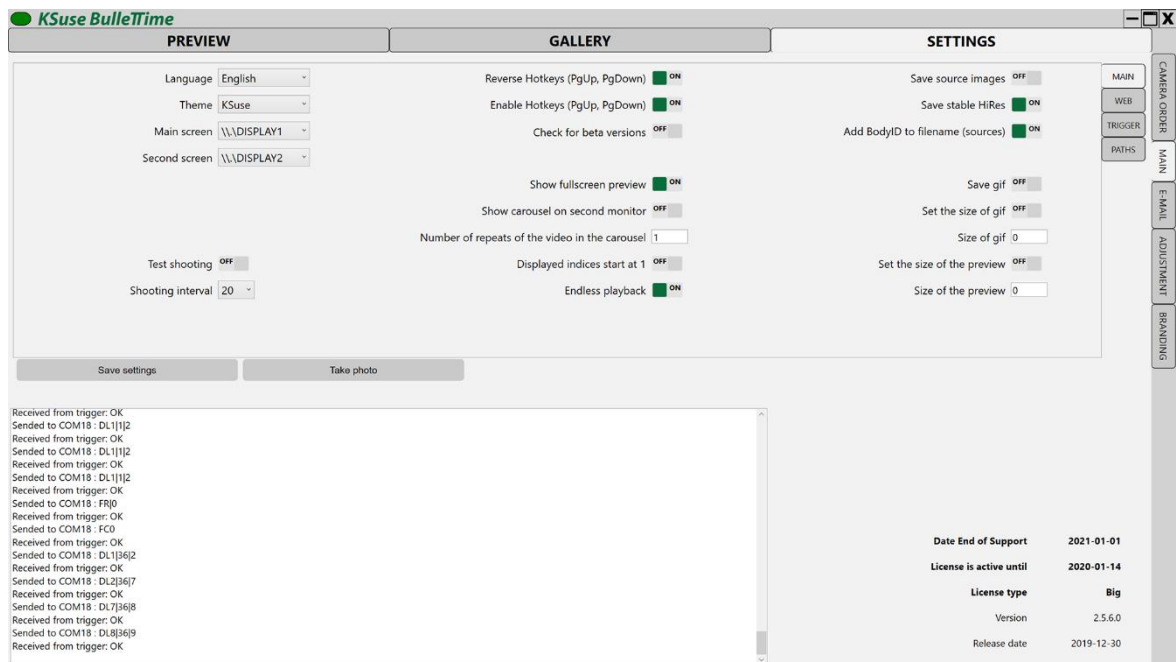
Using the arrows below these buttons, you can shift the zoom area relative to the full frame.

"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.

## General settings window

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



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

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".

**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 Hotkeys (PgUp, PgDown)” - The ability to disable the hot keys Page Up and Page Down.

“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.

“Fullscreen Preview” - Enable / Disable the viewing window for participants / photographer.

“Carousel on the second monitor” - Enable / Disable the view window of the entire captured video.

You can further limit the files displayed in the gallery by setting the start date and time.

The gallery also has another limitation - 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.

“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.



## Webpage Settings

Date End of Support	2021-01-01
License is active until	2020-01-14
License type	Big
Version	2.5.6.0
Release date	2019-12-30

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

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

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

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".

## Trigger settings

Trigger port: COM18

Port of additional controller:

Camcorder number: 4

Trigger type: dzentech

Type of additional controller: usb

Does not release the half-press (usb): ☒

Monitor trigger responses: ☒

	Tr. 1	Tr. 2	Tr. 3	Tr. 4	Tr. 5	Tr. 6	Tr. 7	Tr. 8	Tr. 9
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flash delay (ms): 0

Save settings Take photo

2019-12-12 21:00:12 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:12 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:12 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:12 Sented to COM18 : FR1  
 2019-12-12 21:00:12 Sented to COM18 : ZR  
 2019-12-12 21:00:12 Sented to COM18 : FC0  
 2019-12-12 21:00:12 Sented to COM18 : DL0|1|1  
 2019-12-12 21:00:12 Sented to COM18 : DL0|1|1  
 2019-12-12 21:00:12 Sented to COM18 : DL0|1|1  
 2019-12-12 21:00:13 Sented to COM18 : DL0|1|1  
 2019-12-12 21:00:13 Sented to COM18 : DL0|1|1  
 2019-12-12 21:00:13 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:13 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:13 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:13 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:13 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:13 Sented to COM18 : DL1|1|2  
 2019-12-12 21:00:13 Sented to COM18 : FR1

Date End of Support: 2021-01-01  
 License is active until: 2020-01-14  
 License type: Big  
 Version: 2.5.6.0  
 Release date: 2019-12-30

“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!**

“Camera number” - Camera index, which will be used to shoot video in video + bullet mode.

“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.

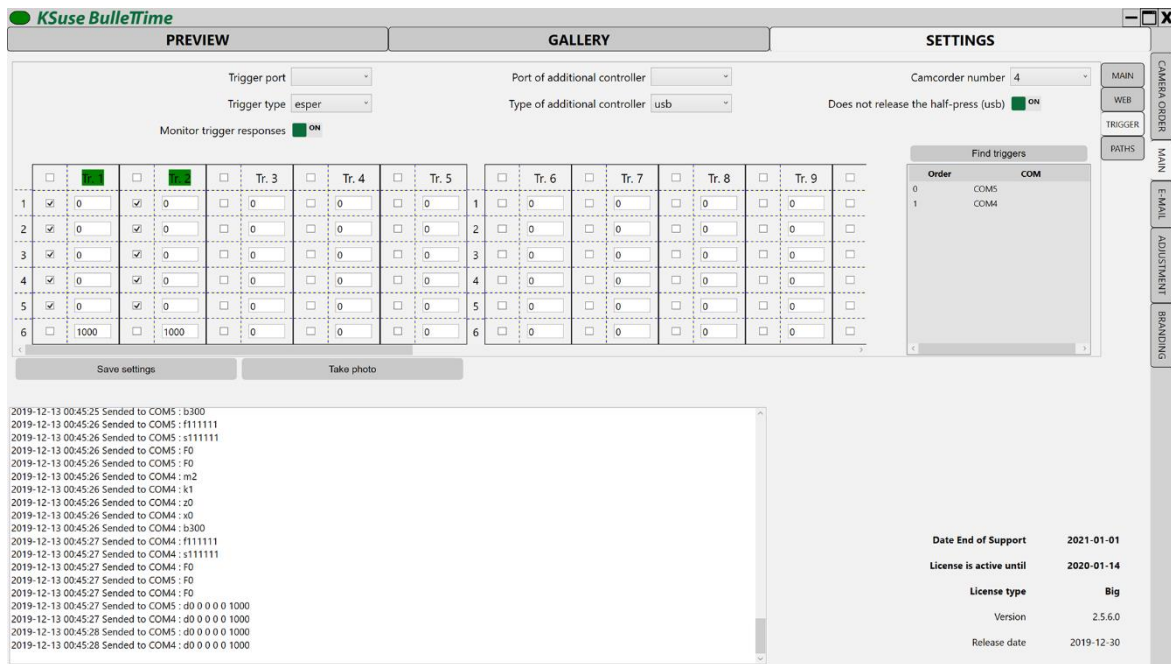
The block with the choice of ports to which the cameras are connected is available when the Dzen Tech trigger is selected. **You must choose the right values for the correct operation!**

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=7AAAh\\_YCjo](https://www.youtube.com/watch?v=7AAAh_YCjo)



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.

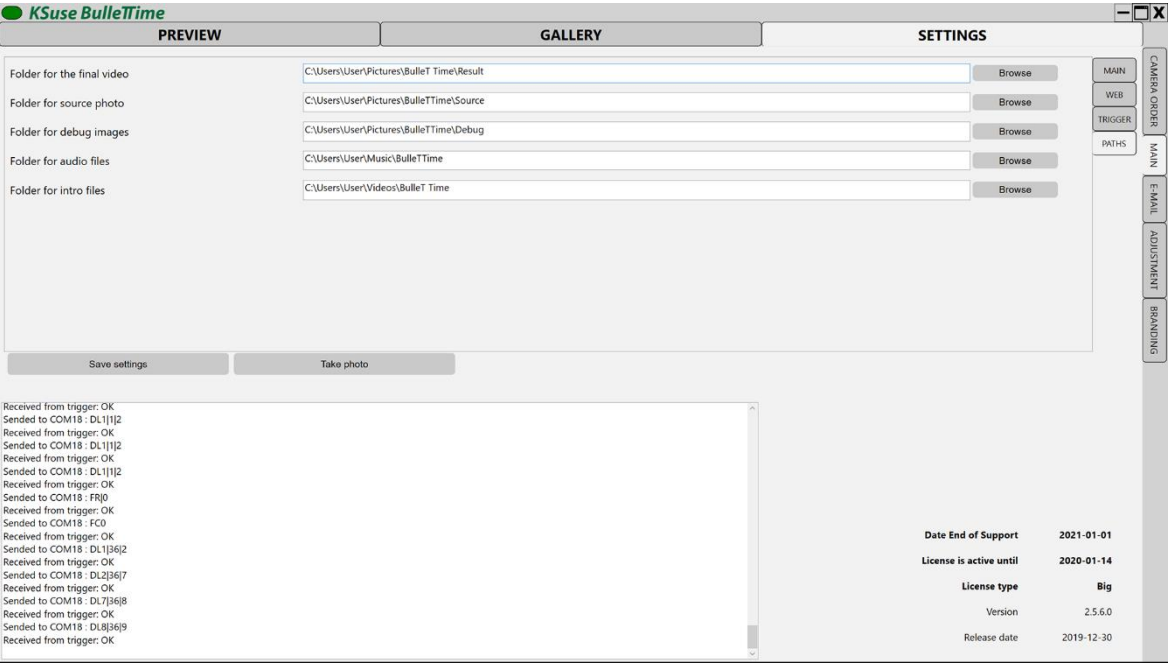
If the port is not marked as used for the camera, then a signal is sent to it with the pause specified in the text field. The value is in ms.

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>

Folder location settings



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!**

## Window "E-MAIL"

## Email Settings Window

**KSuse BulleTime**

**PREVIEW** **GALLERY** **SETTINGS**

Save settings

Send through SendGrid ☐ OFF

SendGrid API Key

FTP server

FTP login

FTP password

Upload everything to ftp ☐ OFF

Upload stabilized sources to FTP ☐ OFF

SMTP timeout (in seconds)

Automatically resend ☒ ON

Mailbox:

From <email>

Smtt port

Mail server

Login

Password

SSL (TLS) ☒ ON

Web gallery: <http://192.168.18.120/>, <http://192.168.187.33/>

Web carousel: [http://192.168.18.120/c\\_](http://192.168.18.120/c_), [http://192.168.187.33/c\\_](http://192.168.187.33/c_)

Last video: [http://192.168.18.120/last\\_](http://192.168.18.120/last_), [http://192.168.187.33/last\\_](http://192.168.187.33/last_)

CAMERA ORDER MAIN E-MAIL ADJUSTMENT BRANDING

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.

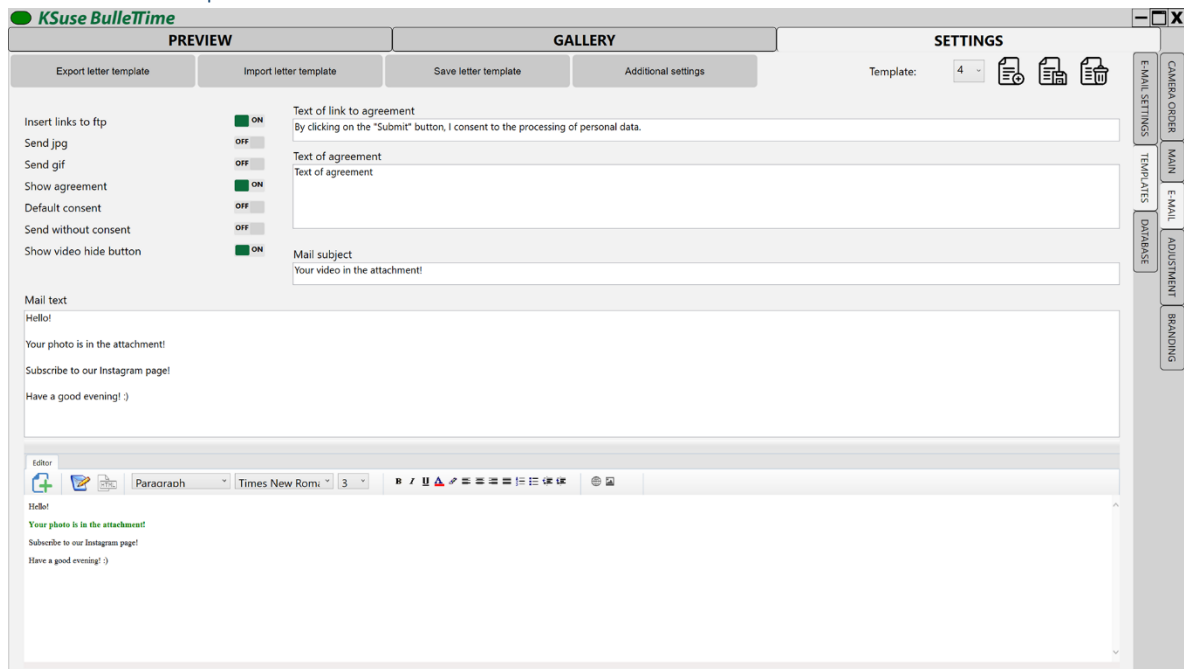
In the folder on the ftp server, you need to create folders: "gif", "mp4", "jpg" and give write permissions. They will load the appropriate file types.

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

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.

In the "Email From" field, you must enter the e-mail from which the sending will be made. It is possible to specify a display name and in square quotation type an email. The specified email must match the account on the mail server.

## Windows “Templates”



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

**It is necessary to fill in both text and html version of the letter!**

“Show video hide button” - displays a button in the web gallery to hide the current video from web pages.

Emails are sent using the template selected on this page.

When the program starts, the one that was last saved will be automatically selected.

## Window "Additional Settings"

**PREVIEW**

Export letter template Import letter template Save letter template Additional settings

Template: 4

**SETTINGS**

Text of link to agreement

Name	Show?	Print?	Font	Font style	Font size (pt)	Font color	Stroke size (px)	Stroke color	Indent left (%)	Indent right (%)	Required field
ID	OFF	OFF	Arial	Regular	14	Black	0	White	10	90	OFF
Name	OFF	OFF	Arial	Regular	14	Black	0	White	10	90	OFF
Surname	OFF	OFF	Arial	Regular	14	Black	0	White	10	90	OFF
Caption	OFF	OFF	Arial	Regular	14	Black	0	White	10	90	OFF

Save settings

Editor

Paragraph Times New Rom 3 B I U A

Hello!

Your photo is in the attachment!

Subscribe to our Instagram page!

Have a good evening! :)

In this window, you can choose which additional data entry fields to display in the web gallery.

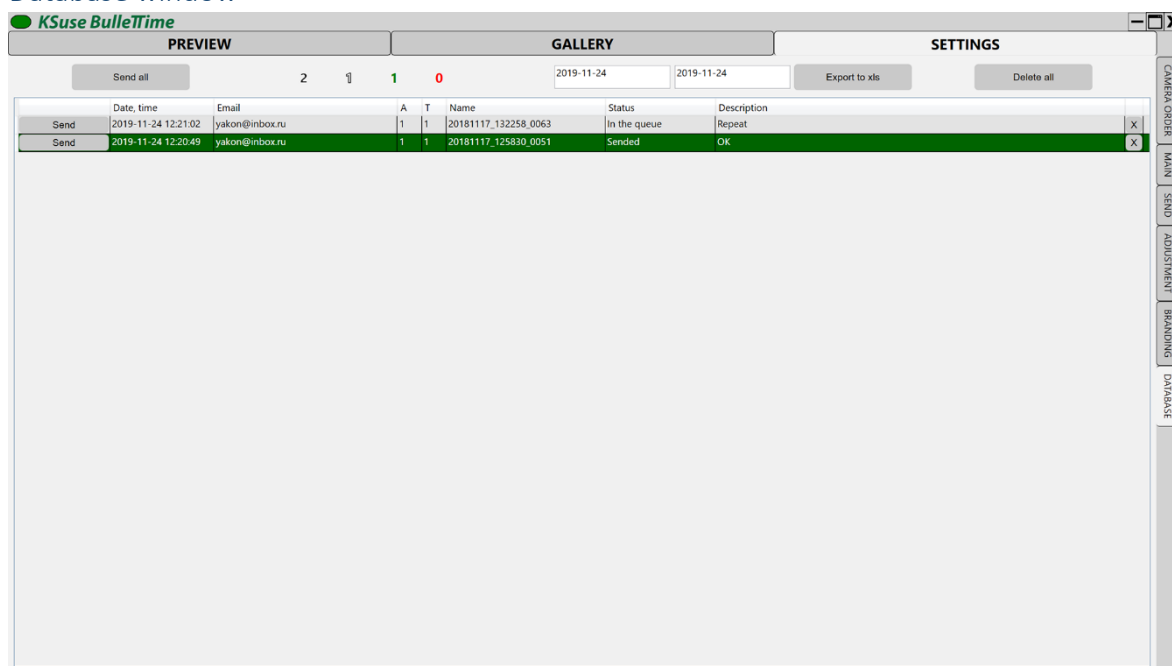
The collected data is contained in the exported xls file.

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



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.

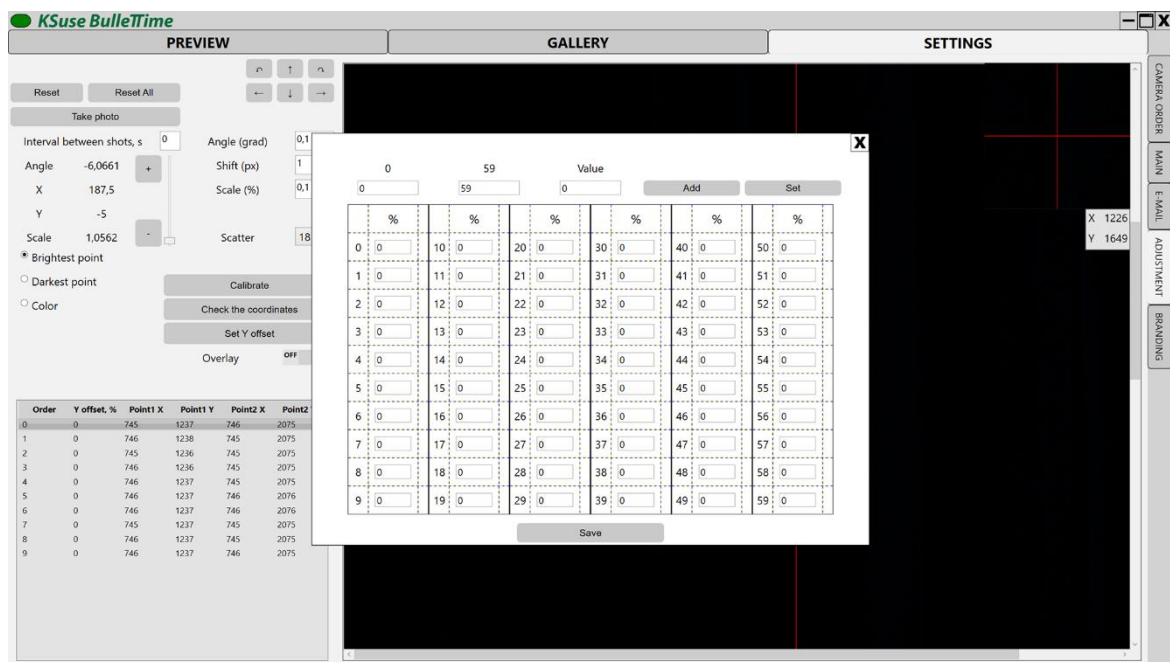
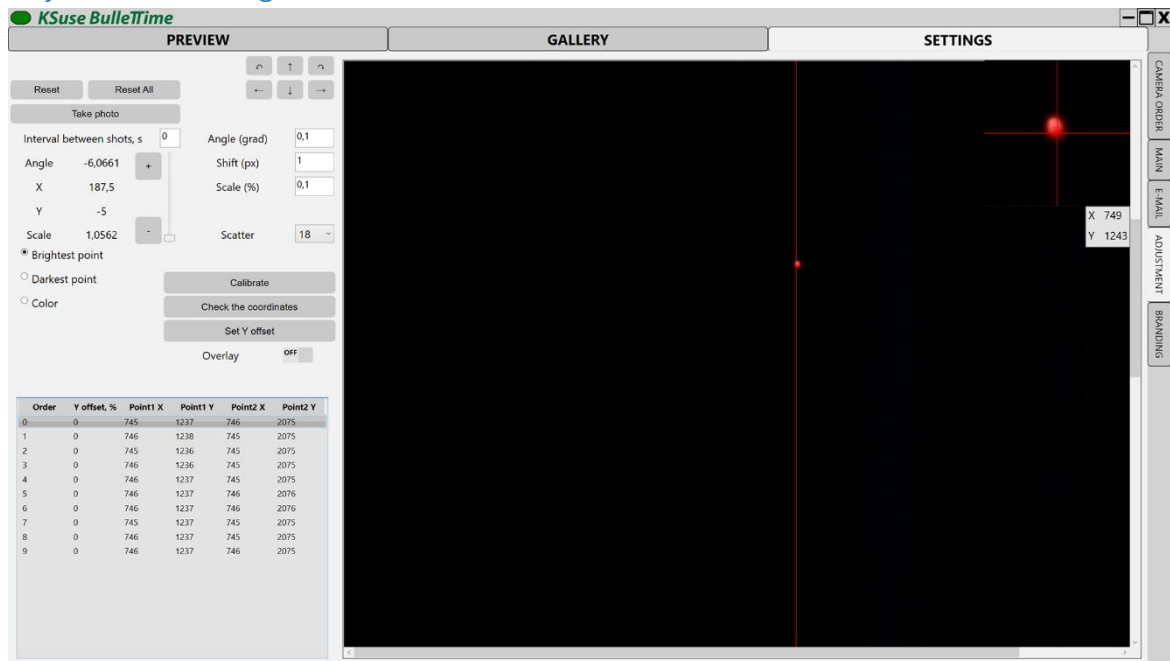
In the table you can change the email address of the recipient and the number of the template.

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

"T" - letter template number

"M" - mailbox number

## Adjustment settings window



It is used to configure the adjustment 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.

“Save All” - Save all calibration settings (used only for manual tuning).

“Reset All” - 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.

Arrows are used to manually shift the 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.

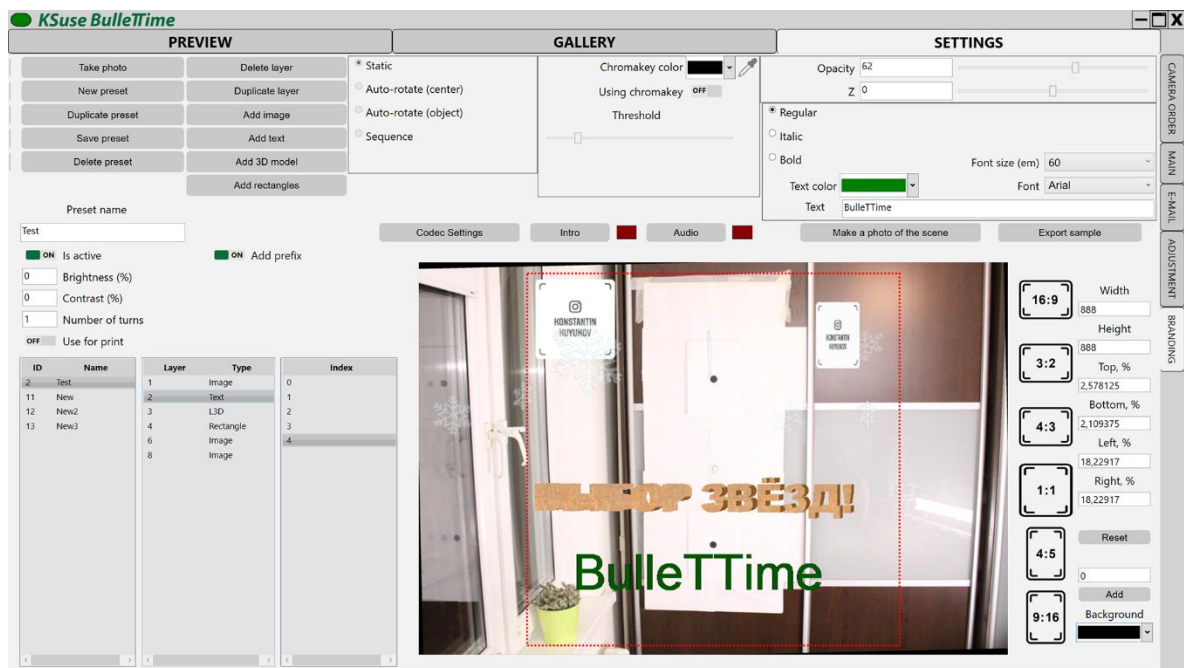
It is recommended to calibrate in M mode without compression.

If the calibration is unsuccessful, then you should interrupt the calibration, click "Reset All", 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. See the “Standard Calibration Procedure” section for a complete description of the calibration process and video.

## Branding settings window



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 chromakey, 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".

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

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

"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.

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

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

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

The left mouse button while holding down the Ctrl key moves the border of the crop. When pressed in the upper quarter of the frame moves the upper border, in the lower quarter moves the lower border, etc.

**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.

The preset is customized by adding layers: text, image layers, layers with 3D graphics.

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 - 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.

Layers overlap in the order in the list.

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 overlaid 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 without connected cameras.

To do this, you must first configure the program with the connected cameras. In the future, in the branding window will be displayed as many cameras as were stored in the main settings.

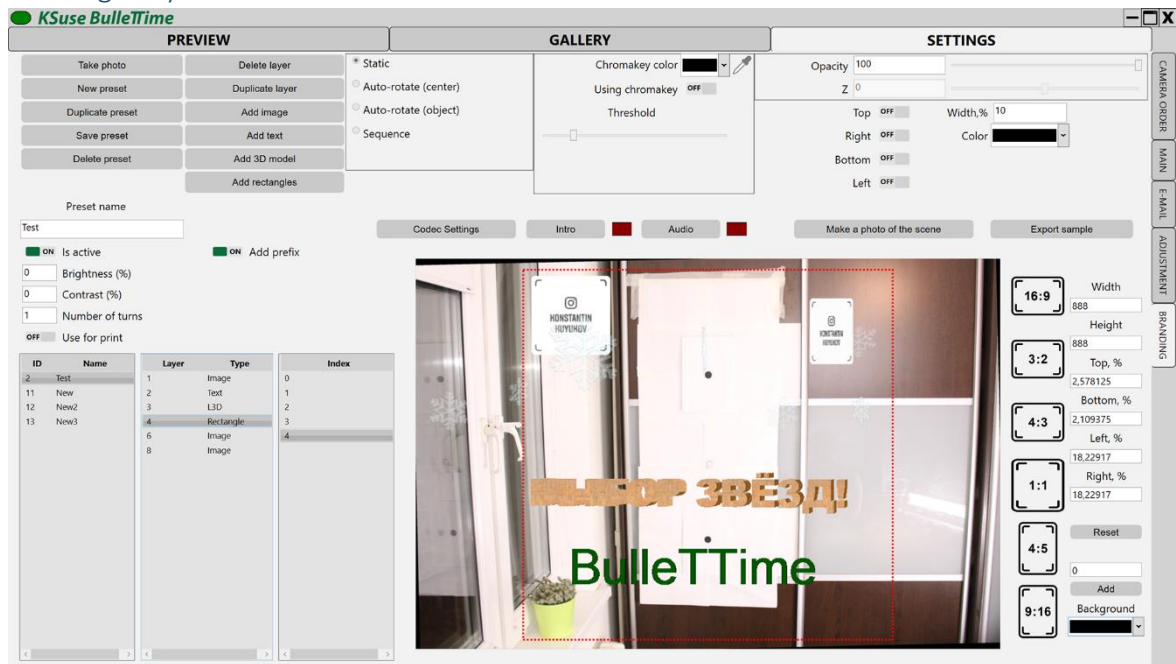
When you click on the "Make a photo of the scene" button, photos is taken and the images are saved for presets.

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.

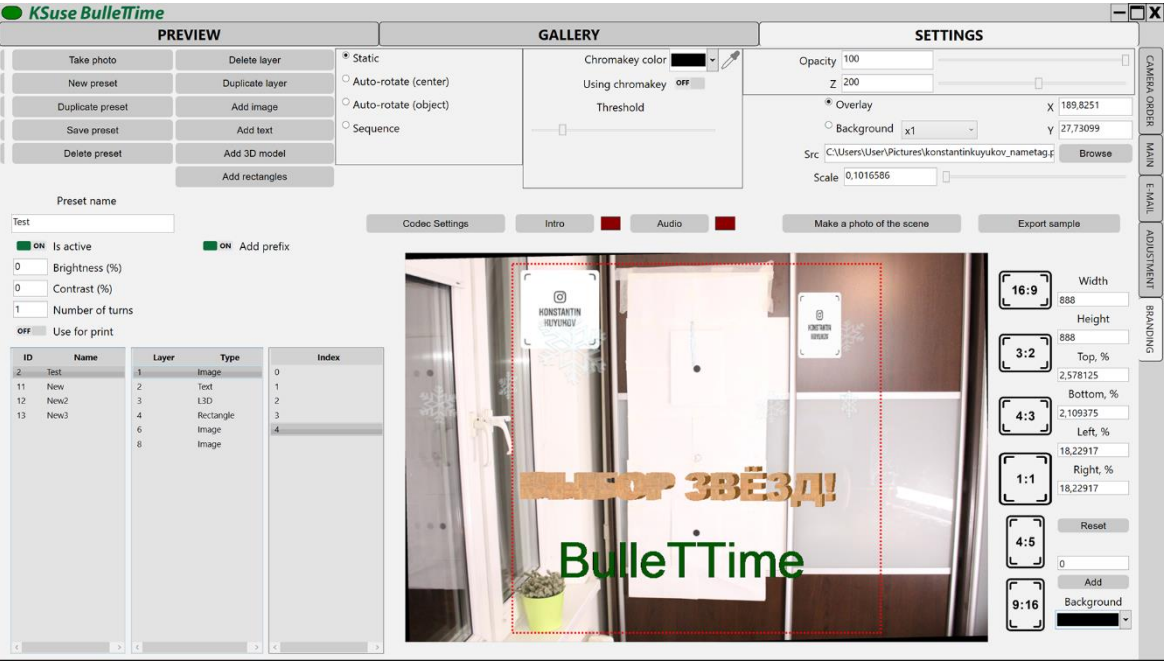
Also, using this function, you can configure the removal of chromakey. To do this, take a picture of the scene, and then set the color and threshold for the current image.

## Rectangle layer:



This layer makes it possible to make an arbitrary framing of the image without changing the aspect ratio of the frame.

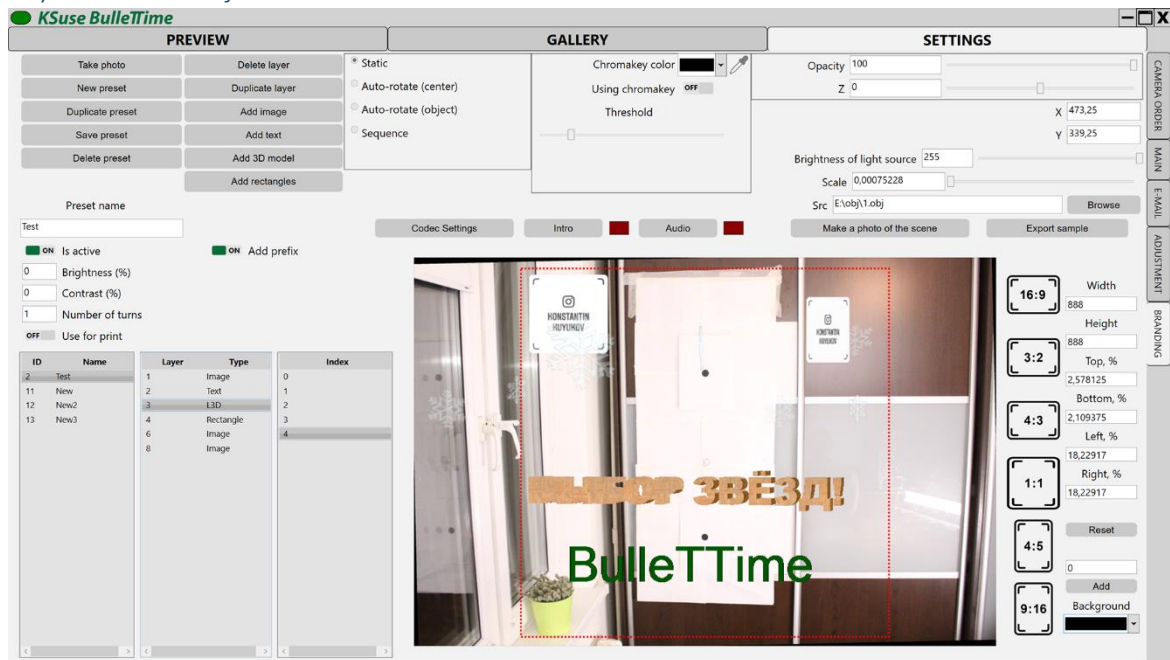
Image layer:



If “overlay” is selected, the image is superimposed over the one received from the camera.  
If the "background", then instead of chromakey.



## Layer with 3D object:



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.

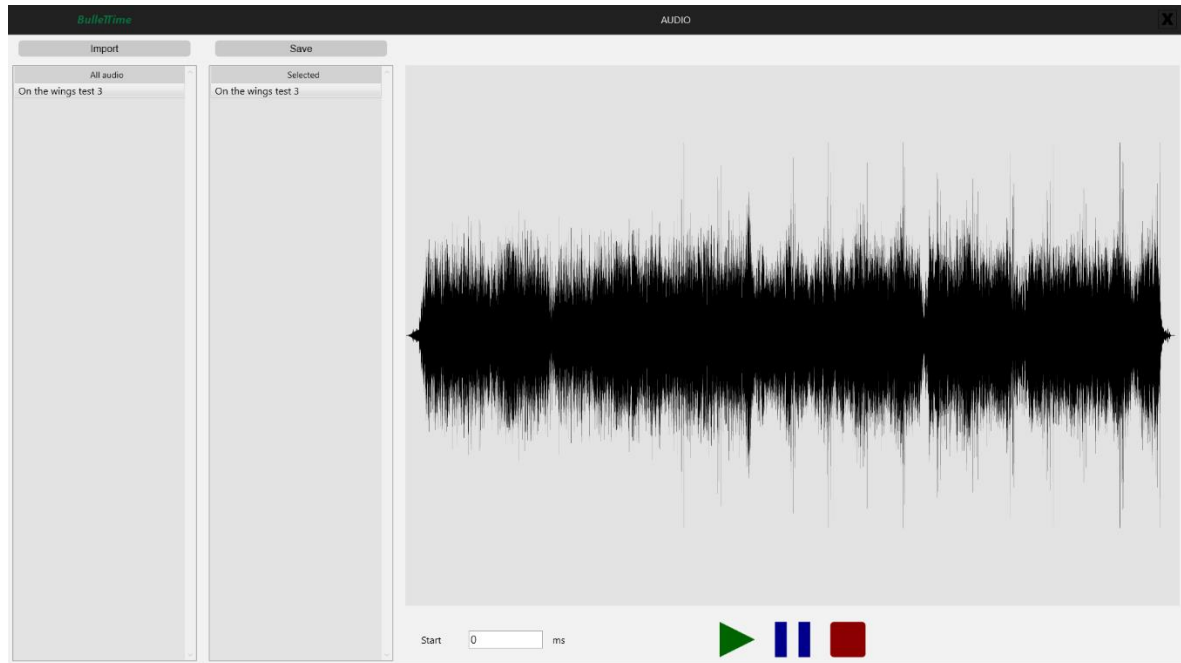
It is quite difficult to see the 3D model in the preview window.

Model can be located far beyond the window.

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

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

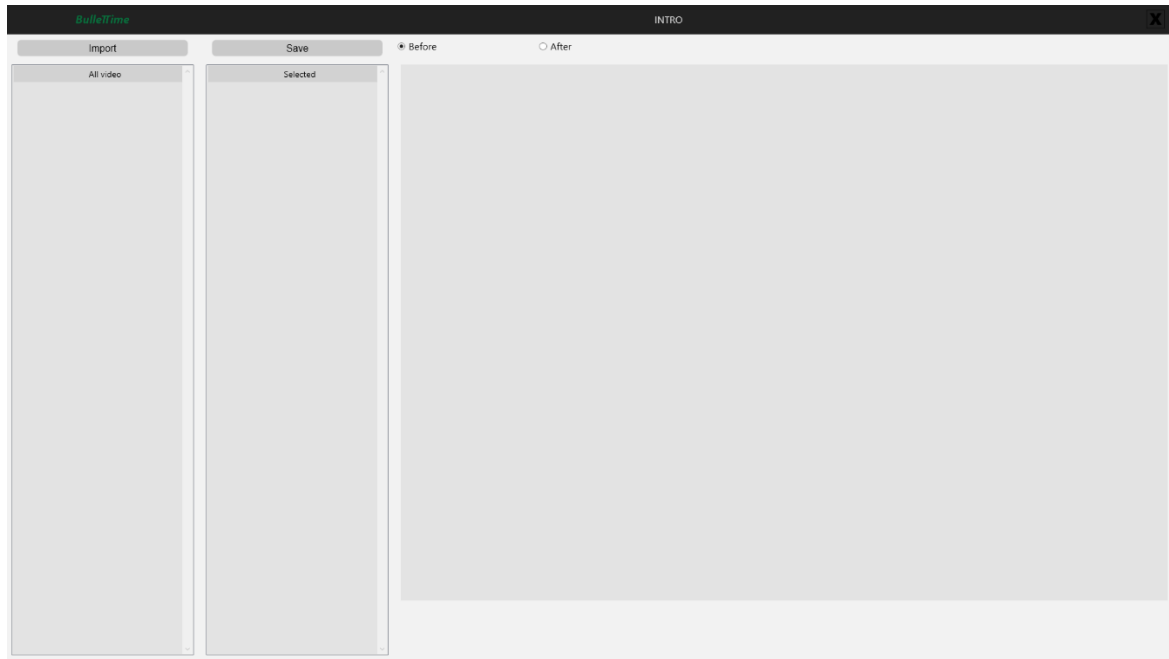
## Audio editor



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



In this window it is possible to import video files in mp4 format. The video that will be used in the preset as a 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.

## Standard calibration procedure

1. Initial setting: turn on the cameras, do not start the program, 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, autofocus may be lost.
3. Setup in the program: start the program, check that the AF lock is on, check the order of the cameras, take a picture. From the first shot, it will become clear whether all the cameras are sending a picture, whether the focus is set correctly everywhere, and you can correct the settings to accurately determine the diodes (ISO, aperture, shutter speed) , are there any other light sources in the search areas.
4. Set up search zones for marker/diodes in the "Camera order" menu using Live View.
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 picture.
7. "Check the coordinates". Make sure that all the LEDs are correctly defined.
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. It is also worth choosing a smaller value in the calibration error field for more accurate mixing (although the smaller the number of pixels selected and the larger the image size (S1, M, L), the longer the calculation takes place).
10. Press "Calibrate " and wait.
11. "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 the software.
2. De-energize the installation (cameras, usb hubs, trigger).
3. Disconnect the usb cable from the laptop.
4. Wait 30 seconds.
5. Connect the usb cable to the laptop.
6. Power up.
7. Run the software.

## Hotkeys

- C, V - preparation for shooting (half press)
- D, F - cancel preparation for shooting (release the button)
- Enter, space - shutter release (full press)
- 1 - uniform boomerang
- 2 - boomerang with a slowdown
- 3 - boomerang with acceleration
- 4 - boomerang with a slowdown to the center
- 5 - boomerang with acceleration to the center
- 8 - video + bullet + video
- 9 - video + bullet
- 0 - freeze
- - - 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.

## Possible problems and their solution

Caption: "No key"	Check that the usb key is connected and the blue indicator is lit on it
The caption: "No key" although the key is inserted and the light bulb is on it	<ol style="list-style-type: none"> <li>1. Check the cable from the usb hub with the key to the laptop</li> <li>2. Install the senselock driver</li> </ol>
The list of cameras is empty	Check the connection of the usb cable
The red indicator in the software interface	<ol style="list-style-type: none"> <li>1. Go to Settings - Order.</li> <li>2. Check that there are all cameras in the list of cameras, all display a BodyID and have a sequence number different from 1000.</li> <li>3. There is no caption: "Incorrect number of cameras in the trigger settings".</li> <li>4. The caption: "Must be X cams" is green.</li> </ol>
Caption: "Incorrect number of cameras in the trigger settings"	<ol style="list-style-type: none"> <li>1. Check that the number of cameras in the list corresponds to the number of connected.</li> <li>2. Go to Settings - Main.</li> <li>3. Install the number of cameras connected to each trigger.</li> </ol>
The caption: "Must be X cams" is red.	<ol style="list-style-type: none"> <li>1. Check that the number of cameras in the list corresponds to the number of connected.</li> <li>2. Click save settings.</li> </ol>
Black indicator	<ol style="list-style-type: none"> <li>1. Go to Settings - Main.</li> <li>2. Check the trigger settings (port number, type).</li> <li>3. Restart the software.</li> <li>4. Perform a full reboot procedure if the previous steps did not help.</li> </ol>
Black indicator	<ol style="list-style-type: none"> <li>1. Perform a full reboot procedure</li> </ol>



After the shutters are released, the “purple” indicator	<ol style="list-style-type: none"><li>1. Check that all cameras take a picture (turn on the displays on all cameras, take a picture, everyone should blink).</li><li>2. Click "Reconnect" in Settings – Camera order.</li><li>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".</li></ol>
Did not receive a letter	<ol style="list-style-type: none"><li>1. Open Settings - Database</li><li>2. Find the line with the entered address and frame number.</li><li>3. Check that the address is correct.</li><li>4. If the line is green, then ask to check the Spam folder of the mailbox.</li><li>5. If the line is red, then try to send again by clicking on the "Send" button.</li></ol>

## Used libraries

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<http://accord-framework.net/>

<https://github.com/mrousavy/AnimatedGif>

<https://github.com/everbytes/BigMath>

<https://github.com/haf/DotNetZip.Semverd>

<https://github.com/aspnet/EntityFramework6/wiki>

<https://github.com/xceedsoftware/wpftoolkit>

<https://github.com/robinrodricks/FluentFTP>

<http://www.helix-toolkit.org/>

<https://github.com/MarkerMetro/MarkerMetro.Unity.Ionic.Zlib>

<https://github.com/naudio/NAudio>

<https://www.newtonsoft.com/json>

<https://github.com/tonyqus/npoi>

<https://github.com/sendgrid/sendgrid-csharp>

<http://sharpdx.org/>

<https://github.com/icsharpcode/SharpZipLib>

<https://system.data.sqlite.org/index.html/doc/trunk/www/index.wiki>

<https://dotnet.microsoft.com/>

<https://github.com/teichgraf/WriteableBitmapEx>

<https://www.ffmpeg.org/>

<https://github.com/Alex141/CalcBinding>