Lasertag. net

(GALAXY platform)

User's manual

TABLE OF CONTENTS

Arena laser tag is one of the varieties of a fascinating and dynamic game of laser tag, taking place in real time and space. The difference of this type is that the games are held in closed darkened rooms, as a rule, anthurized under space wars. These conditions determine the specific indication - initially, at the start of the game, the vest and blaster sensors glow with the color of the team, and when an opponent's blaster beam hits them, they flash white briefly.

Aim of the Game is to hit by blaster's beam the sensors which are attached on opponent's vest or weapon (the sensors may be attached on extra equipment as well). Player and its team are earned points for each successful action (hit the opponent, base, domination box, etc. capture). Depending on the settings, points are deducted for opponent's hit into the sensors of opposite team player, respawn, unsuccessful shot, etc. Statistics are quickly transmitted to the control computer and can be displayed on a screen of a monitor, projector or television.

The minimum set for playing arena laser tag consists of sets of blaster + vest, router and chargers. Setup, management of the game kits, and also statistics accounting and broadcast is done through the Arena program installed on the device with the Windows operating system.

Blaster

Vest

Connection cable

General view of the kit

Also, for a variety of gameplay, electronic devices manufactured by our company can be used: Smart Domination Boxes, Multistations, SIRIUS station.
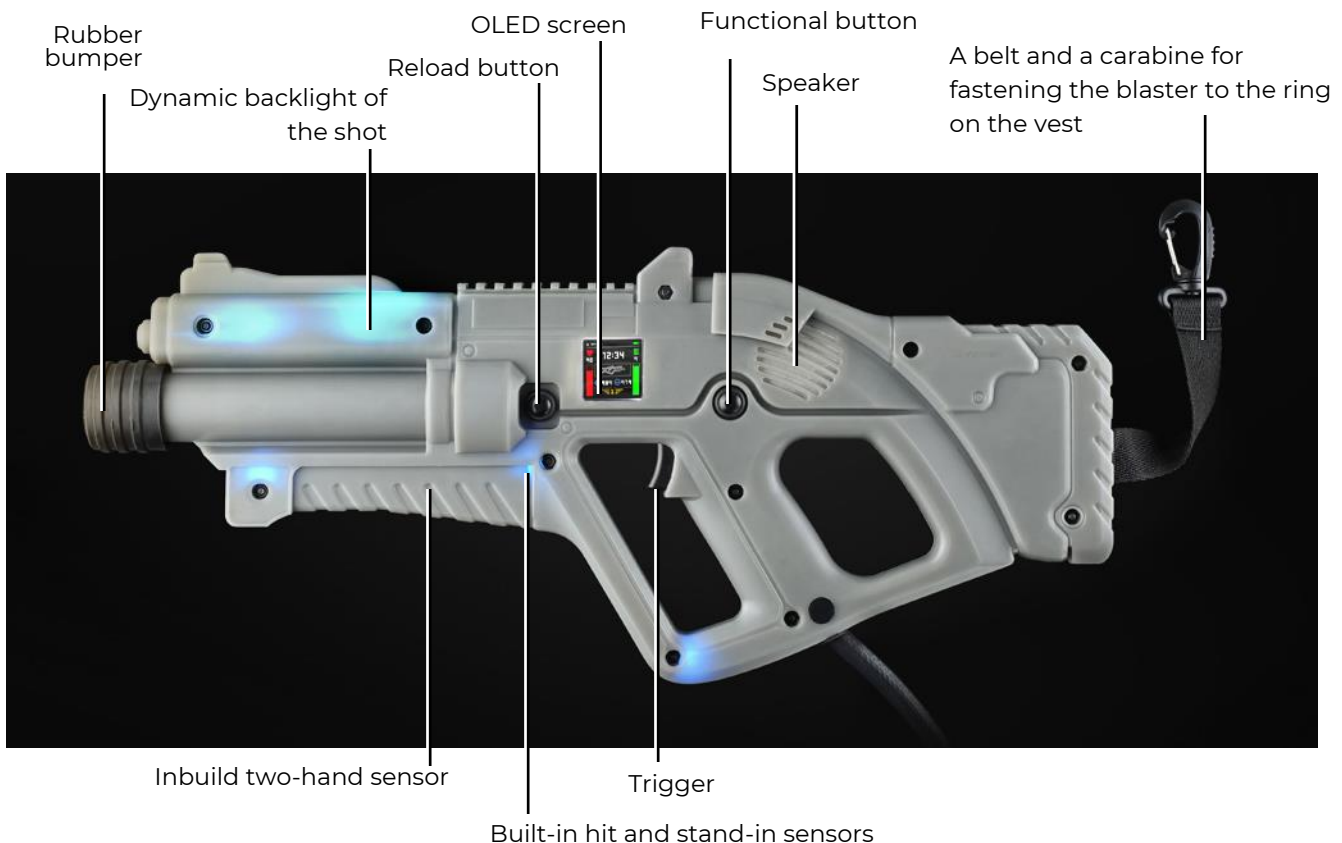
1. Blaster

The blaster is a simulator of "space" weapons emitting coded infrared rays with a carrier frequency of 56 kHz and a wavelength of 940 nm.

As emitters, Vishay's TSAL6100 IR diodes are used.

To increase realism, the IR beam during the shot is duplicated by a light beam like a laser pointer.

A feature of this blaster model is that it is made of translucent ABS plastic in gray.

Rubber bumper

Dynamic backlight of the shot

OLED screen

Reload button

Functional button

Speaker

A belt and a carabine for fastening the blaster to the ring on the vest

Inbuild two-hand sensor

Trigger

Built-in hit and stand-in sensors

The main elements of the blaster

The blaster is connected to the vest through a flexible cable, reinforced with a sleeve. Each blaster is equipped with a rubber tip, which reduces the risk of players getting physical injuries during possible collisions.

The blaster is equipped with 9 hit sensors (4 on each side + frontal) built-in to the body, which enable the opponent to hit the player not only in the vest, but also in his weapon. Flashing RGB-LEDs in white on these sensors, as well as an audio signal, informs the player that he was hit.

In addition to the hit indicators, a dynamic backlight synchronized with the shot was used in the blaster body.

A two-hand sensor is installed in the case, which does not allow playing the game, holding the blaster with one hand.

Each blaster features a multicolored screen that operates in 3 modes:

- Pre-game mode displays initial parameters to start the game round;
- Game mode displays actual player's info during the game round;
- Post-game mode displays game statistics after the game is over.

There are more than 10 values that are displayed on the screen at once: dynamic health and ammo level scales, number of successful hits, type of weapon, rating and much more.
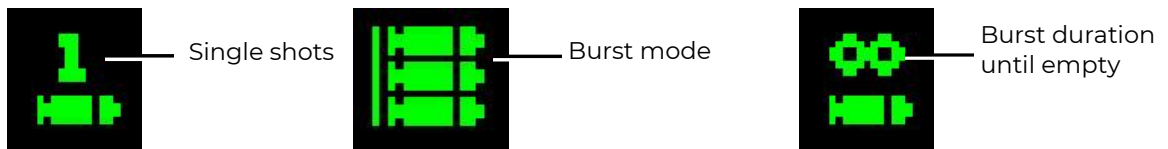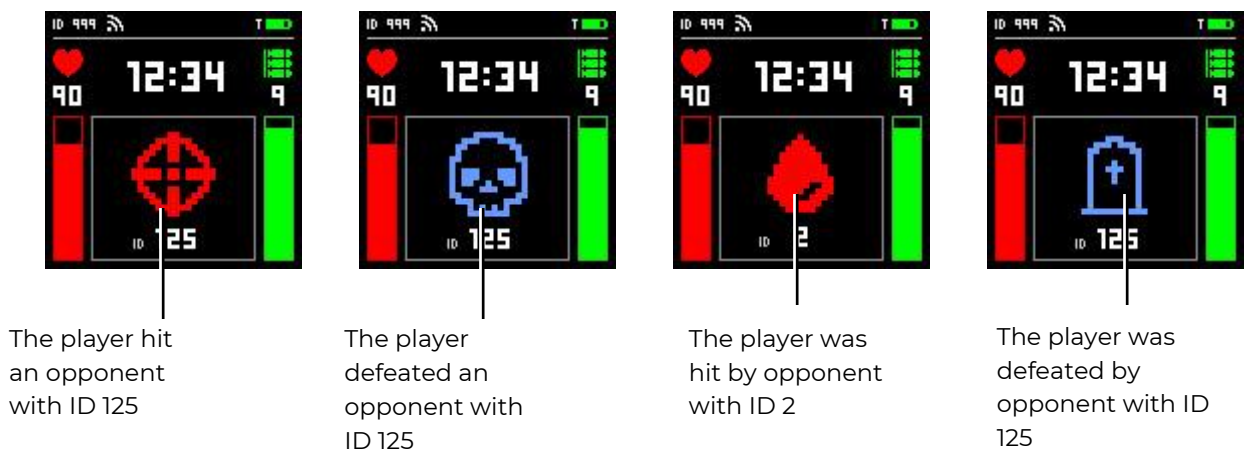
Player's team color

The number of clips at the beginning of the game

Kit ID

Server connection indication

Battery charge level

Fire mode

The number of hits in the opponent

The number of defeats from the opponent

The number of hit opponents

Number of cartridges in the clip

Health level

Ammo level

Rating

Number of gained points
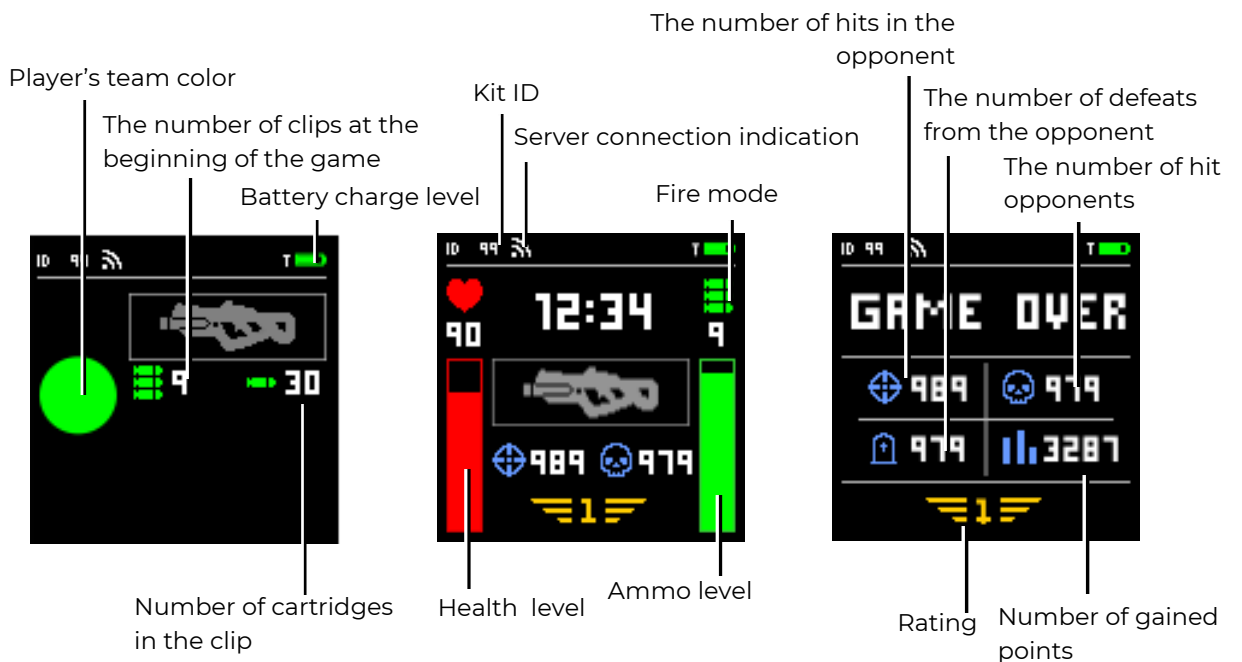
Information displayed on the on the blaster's screen

Single shots

Burst mode

Burst duration until empty

Pictograms keys of firing modes

The player hit an opponent with ID 125

The player defeated an opponent with ID 125

The player was hit by opponent with ID 2

The player was defeated by opponent with ID 125

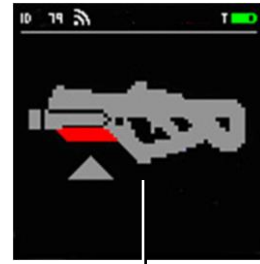**Game situations displaying on the screen of the blaster**

The player was affected by Med KIT

The player was affected by Radiation

Two-hand absence sensor tripped

Game situations displaying on the screen of the blaster
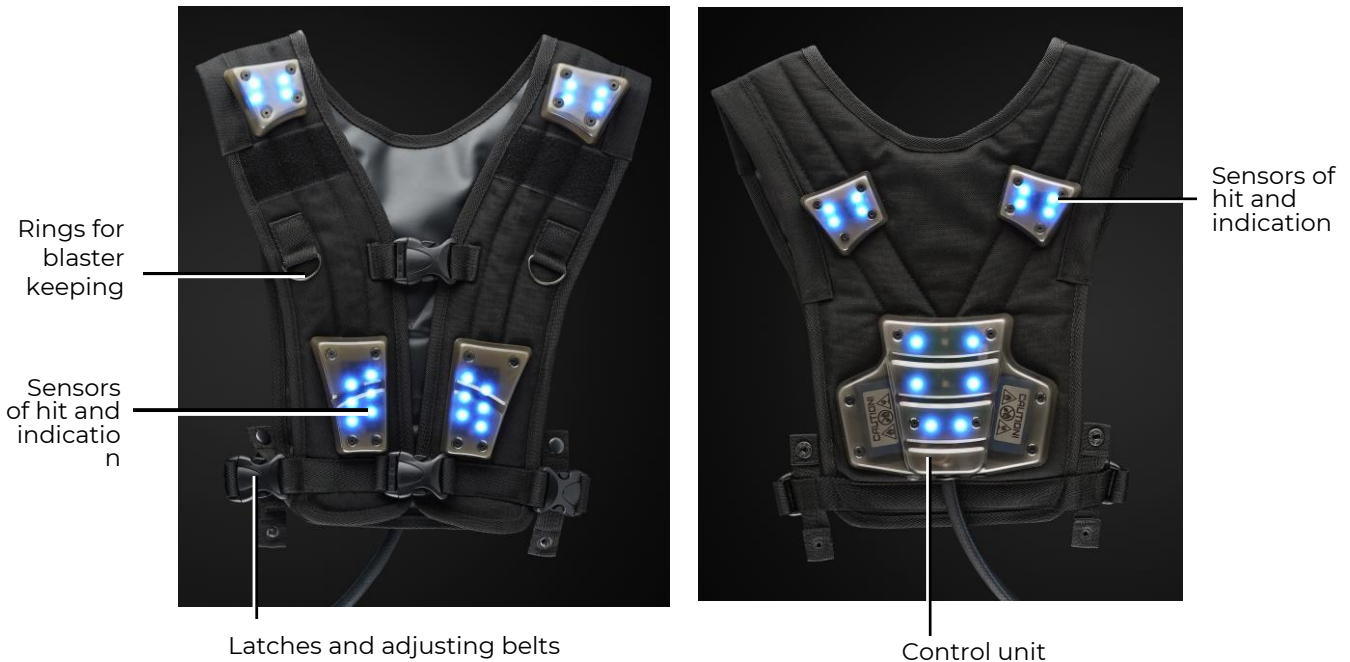
2. Vest

The vest is an integral part of the arena laser tag game kit and is connected to the blaster with a special cable.
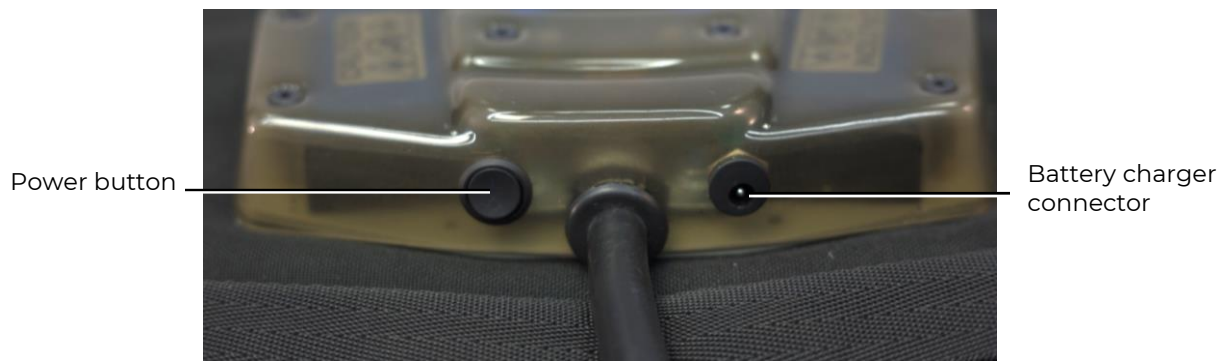
The vest has 7 damage and indication sensors (4 in the front and 3 in the back), the bodies of which are made of durable polycarbonate. The sensors are equipped with vibro-light indication and operate independently of each other, which allows you to record the differential damage to the player by zone visually.

The textile base of the vest is made of durable, wear-resistant cordura material. Two adjustable belts located on the sides allow you to adjust the size of the vest to the complexion and age of most players.

The kit is powered by 2 Li-ion batteries (7.4 V, total capacity 5200 mAh),built- in the control unit of the vest.

Rings for blaster keeping

Sensors of hit and indication

Latches and adjusting belts

Sensors of hit and indication

Control unit

The main elements of the vest

Power button — Battery charger connector

External elements of control unit

Setup, control of game kit as well as game stats reading are performed by means of ARENA software which is supplied as part of package.

3. Battery Charger

To charge the batteries of the arena laser tag equipment, the delivery set includes a charger connected to a 220 V electrical network.

The output voltage is 8.4 V, the maximum charge current is 2 A.

Output cable 8,4 V — Slot — Cord and plug

Charging device

Battery charging

Arena laser tag equipment, produced by Lasertag.net uses lithium-ion batteries with an internal overcharge, deep discharge and shortcut protection circuit.

Nevertheless, serious attention shall be paid to safe handling with Li-ion batteries.

Use ventilated and fireproof room to charge the batteries. In case of possible inflammation of batteries, it shall not cause fire in the entire premise.

Temperature mode of Li-ion batteries charge affects their capacity being reduced during charging process in the cold or heat environment. The charge shall be done under environmental temperature in the range of +4°C to + 40°C, but optimum charging temperature is +24°C.

Insert charger outlet cable into appropriate connector on the vest control unit. Insert battery charger plug into 220V socket.

Average charging time of a kit is 3 hours.

Safety precautions for the process of batteries charging are presented in a special section of this manual (chapter 13).

4. Wi-Fi router

The kit comes with a Totolink N300RH device as a Wi-Fi router. The router is based on the Realtek RTL8196E-CG network processor and is capable of providing data transfer rates of up to 300 Mbps.

Antenna

Body
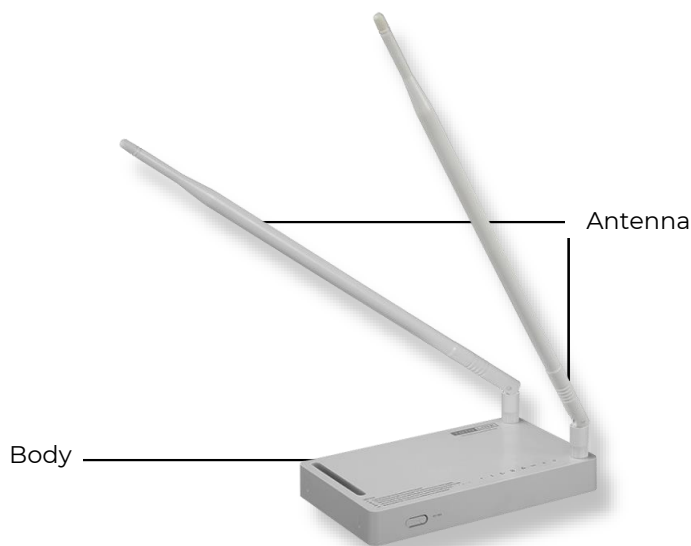
**Totolink N300RH general view**

The router is equipped with an external power supply (12 V, 1A), a UTP cable and two antennas with a gain of 11 dBi.

⚠ **When using a portable power source (powerbank) for operation of the router, the output voltage is necessary to be 12 V - the rated voltage of the router's power supply.**

⚠ **Do not use the power supply of the router to charge the batteries of laser tag equipment!**

The Reset button resets all the router settings.

WAN port   4x LAN ports   Power supply slot
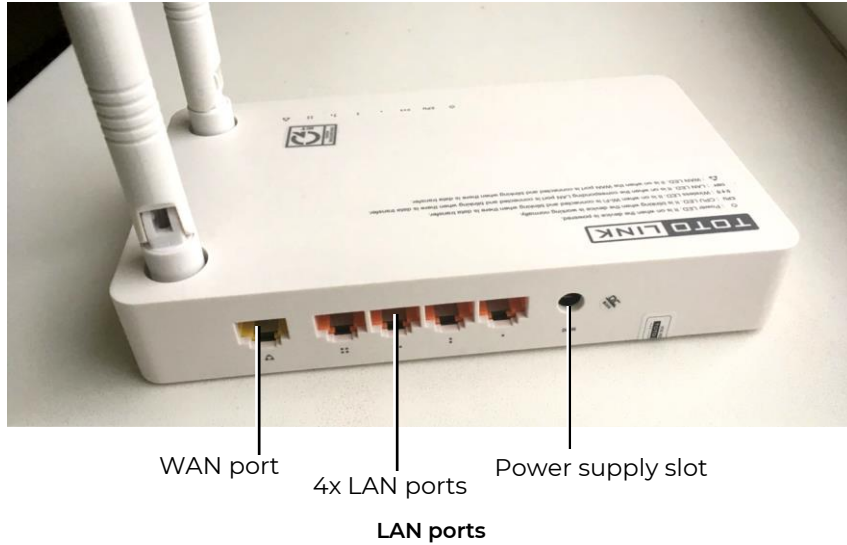
LAN ports

There are 4 LAN ports on the connection panel, a WAN port for connecting the provider's cable and a slot for connecting the power supply.

ℹ️ **The device is delivered completely set up for operation with the software and the equipment for laser tag produced by the Lasertag.net company.**

Network setup is described in the chapter 8 of this manual.

5. Domination Box Smart

The Smart Domination Box (DBs) – an additional device that allows you to implement one of the most interesting scenarios in the indoor laser tag - "Capture a domination box". The main difference is the presence of 3 indicator scale, that shows the capture degree of each command, as well as 5 modes, which allow to record the capture for both - time and shots.

Capture is made by an infrared ray pulse directed from the laser tag gun into the sensor. The sensor is placed in the lower inner part of the device, so the emitter must be placed vertically downward relative to the base plane of the Domination box.

The device is powered by Li-ion batteries (7.4 V, total capacity 5200 mAh) located in the case. The batteries are charged from the mains with a standard charger with an output voltage of 8.4 V and a maximum charge current of 2 A.

Smart Domination Box general view

The device consists of a stand and a case, on the outside of which there are three racks with 16 LEDs in each. On the case itself, there is a connector for the charger, a service button and a power button. Three IR-emitters are mounted on the top cover, another 3 are mounted in the upper part of the case on three sides, providing a circular effect on the kits of players. There is an electronic board with an infrared receiver, a speaker and batteries inside the case.

The goal of the Domination Box is to record its "capture" by players of different teams, summarize the total capture time or the number of hits in the DB infrared receiver and determine the winner.

Device settings and control are performed in the ARENA program via the Wi-Fi channel (chapter 10.1.1. of this manual).

The Smart Domination box has three operating modes: standby, game and service.

Standby Mode

Upon power-up, the Domination Box switches to the standby mode. Two central LEDs are lit with the color of the current DB mode. To find out the battery's charge level in this mode you should press and release the service button. The number of glowing purple LEDs will indicate the battery charge: 16 LEDs - 100%, 8 - 50%, etc.

Game Mode

The domination box can work in 5 display modes ("Capture for time"; "Capture with shots"; "Tug of war"; "Triple capture" and "Raise the flag"), each of which is configured either by the number of shots or by time DB holding required to determine the winner of the round. Indication of the settings is carried out by the glow of 10 central LEDs. The color of their glow corresponds to a certain mode, which is displayed in a sticker placed on the device case.

In the capture modes for time, you can set the timer for 1, 2, 4, 5, 7, 10, 15, 20, and 30 minutes.

In the modes of capture by shots, the number of hits in the device receiver is set from 50 to 500 in increment of 50.

"Time Capture" Mode.

2 to 4 teams are participating.

This is a "classic" mode. At the first shot at the DB sensor, the lower LEDs of all indicator posts are lit by the color of the team of the hit player and the timer of the captured team starts. If at the same time there is no interception by another team, the LEDs will be lit sequentially from the bottom upwards and will show the capture level. The glow of each LED corresponds to 1/16 of the set hold time.

When the box is captured by another team, the timer of the new team starts. The LED strip begins to show the capture level in the relevant color. The timer of the previous team stops and does not reset, but resumes its work after the first team again captures the Domination Box.

After the timer of one of the teams participating in the round reaches the set time (all 16 LEDs light up), the victory is assigned to this team. The Domination Box plays an audible signal and flashes the color of the winning team.

"Shot Capture" Mode.

2 to 4 teams are participating.

It differs from the previous mode in that the capture does not take place in terms of retention time, but in the number of shots fired by players at the DB receiver. Also, so that players do not linger near the Domination Box, the device by default is constantly in the "Radiation" mode during the game in this scenario. At the same time, after the time set in the program, players in the zone of influence of the IR-emitters of the device will be taken away health units. If necessary, this function can be disabled in the program.

At the first hit, the lower LEDs of all racks are lit with the color of the player's team. On next hits, the LEDs will sequentially fill the racks from the bottom up to a multiple of the set capture value. For example, if the setting value is set to 100 hits, then the ignition of each LED will correspond to 100/16 = 6 hits.

When players of other teams enter the DB receiver, the LEDs will show the degree of capture by these teams in the appropriate color. At the same time, the achieved level of the remaining teams is not reset.

When a team reaches the set value of hits, the Domination Box plays a audible signal and starts blinking in the color of the winning team.

"Tug of War" Mode.

2 teams are participating. Time capture.

It differs in that the indication of the degree of capture is made for two teams in real time on all three indicator rack.

When a point is captured by the first team, its timer is activated and the lower 8 LEDs immediately are lit with the color of this team. At the same time, they pulsate and until the point is captured by another team, the glow gradually rises from the middle up. The second team ignites the upper part of the rack with its hit, and now the indicators of its color will "shift down" the LEDs of the second team. The glow of each LED corresponds to 1/16 of the set hold time.

When all the LEDs are lit in the same color, the Domination Box plays an audible signal and starts blinking in the color of the winning team.

"Triple capture" Mode.

2 to 3 teams are participating. Time capture.

It differs in that the indication of the degree of capture of the Domination Box is made in real time for each of the teams in different indicator stands.

After the first hit, the timer of the capturing team is turned on, and the lower LED of one of the indicator racks starts to flash smoothly with the color of this team. As the timer works, the LEDs will light up from bottom up, each of which will correspond to 1/16 of the set hold time. After a player hits another team, they start to light up and flash the LEDs of the second indicator rack from bottom to top. The timer of the previous team stops and does not reset, but resumes its work after this team again captures the Domination Box. The LEDs of this rack stop flashing and remain lit at the achieved level. It similarly occurs after hitting the third team. The DB does not respond to the fourth team.

After all the LEDs of one of the indicator racks light up, the Domination Box plays an audio signal and starts flashing with the color of the winning team.

You can use this mode for two teams as well, but you need to set the Domination Box so that the racks of both participating teams are visible, for example, near a wall.

"Flag Raising" Mode.

Two teams are participating. Capture by shots.

It differs in that the capture is carried out by shots, and the indication of the degree of capture is carried out simultaneously on all indicator racks on the basis of the "flag raising" principle.

After the first shot, the lower LEDs of all three racks are lit with the color of the player's team. When the number of shots is equal to 1/16 of the set capture parameter, the LEDs light up sequentially. If the second team makes a "re-capture", then first the LEDs of the color of the previous team will go out sequentially (the flag of the first team "drops"), and then they will light up with the color of the newly captured team (the flag of the second team is "raised").

Also, as in the "Capture by shots" mode, during the game the IR-emitters of the device by default issue the "Radiation" command, and players who are in the zone of influence of the emitters will be taken health units.

The winner is the team that first "raises" the flag / LED strip of its color. The Domination Box plays an audible signal and flashes the color of the winning team.

Service Mode

The Domination Box control board is equipped with a Wi-Fi module. Thanks to this, it is possible to flash the microcontroller of the device "by air". The need for it arises when updating the firmware (it is planned to increase the number of Box modes to at least 10), as well as to restore the current one.

To perform this procedure, you need a Wi-Fi router and BootLoader program, developed by the company.

The transition to the service mode is carried out by turning on the device with the service button held down.

The transition to this mode will be indicated by a blinking power indicator above the power button.

The procedure for flashing the microcontroller of the Domination Box is given in chapter 11.2.

6. SIRIUS station

Station SIRIUS (StS) is an analogue of the indispensable attribute of many scenario laser tag games - the Utility Box. It differs from the standard device by the presence of an indicator panel, side illumination, a futuristic case and 7 operating modes.

Battery charger port

Power button

IR emitters

LED panel

SIRIUS station

Power supply: 220 V network via a power supply unit (8.4 V 1 A) or a built-in 7.4 V 2600 mAh battery. Sound: no.

The device's activation (impact on the player's sets) is done in three ways, depending on the mode: by shooting the device ("Bonus" mode), automatically by timer (other modes) and compulsory: when a palm covers a sensor for a short time, the touch sensor is activated ("Med kit", "Respawn" and "Arsenal ").

Range with direct visibility: 5-7 meters.

Standby Mode

In sleep mode (before the start of the game and at the end), when the connection with the server is established, the station LEDs light up smoothly and fade alternately in different colors.

Game Mode

When the game starts, the device starts working in the selected mode with the settings specified in the program (the frequency of issued commands, the impact on players of certain teams, the number of shots for deactivation, etc.). Indication will correspond to the mode.

In the current release, SIRIUS station can operate in seven game modes: Respawn, Radiation, Medkit, Arsenal, Random, Bonus and Base.

In the "Respawn" mode, the central four LEDs constantly flash in the color of the team that the device is acting on (if the LEDs are lit in four colors, it respawns everyone). The outer circle of LEDs in this mode performs the function of a timer - the LEDs that are set multiple times in the time program turn on the LEDs in white counterclockwise. After the 8th LED lights up, the device is triggered and respawns the players (restores the starting value of health units and ammunition). Activity is indicated by the frequent flashing of all LEDs in purple. Then the timer starts again and the cycle repeats.

The device can be deactivated by firing at it the number of times that can be configured in the program. Team players, who the device in this scenario is not affected on, can do it. If it is set to "Affect all", then players of all teams can deactivate. The station responds to a hit in the IR-receiver by the frequent flashing of all LEDs in blue. During the self-healing period, the central indicators flash periodically, while the external ones display a countdown timer.

The mode is used in scenarios with a limited number of health units and disabled auto-respawn. One of the options is to install one SIRIUS each on the team bases, having previously configured them to act on a specific team. You should note that the device respawns only those players whose kits have 0 health units, i.e. only the "dead".

"Radiation" - the internal and external LEDs blink yellow, rotating counterclockwise. Activation (the player takes out the number of health units set in the program) is accompanied by the frequent blinking of all the LEDs in purple.

SIRIUS station in the "Radiation" mode can also be deactivated similarly to the "Respawn" mode. The difference is that to put the device on pause, it is possible for the team that the team acts on or all, if it is set to "affect all".

The device in this mode can be used as an anomaly that will protect, for example, an artifact or approaches to the base, if you choose a selective effect on a specific team.

"Medkit" Mode - the central and closest 4 LEDs of the outer circle form an image of the cross of the color of the team that the device is acting on. The cross cyclically lights up and fades out. The outer circle of LEDs also serves as a timer - the LEDs that are set multiple in the time program turn on the LEDs in turn counterclockwise. After the eighth one is lit up, the device is triggered and replenishes the number of health units set in the program for players. In this case, all LEDs flash violet frequently. Then the timer starts again and the cycle repeats.

As in previous modes, in the "Medkit" it is possible to temporarily stop the distribution - after getting into it a certain number of times in the scenario by players who are not affected by the device (with the parameter "Affect all" - all players).

The mode can be used to replenish the health units of "wounded" players (but no more than the value at the start of the game), and you can configure it to "heal" only one team or both teams.

"Arsenal" - a row of three LEDs of the outer circle and one adjacent LED from the central circle form a blue sector that rotates counterclockwise. At the time of activation, the device adds to the player the number of cartridges or clips set in the program (but no more than the starting value), which is accompanied by the frequent flashing of all the LEDs in purple.

In this mode, there is no way either to adjust the selectivity of the distribution of ammunition for teams, or to deactivate the device.

Using the "Arsenal" mode is convenient in scenarios with limited ammunition - the device can be installed on bases (for example, by setting the maximum number of "lives" for kits, but only one clip) or in separate zones for replenishing ammunition.

In the "Random" mode - the central 4 LEDs perform the timer function - they turn on counterclockwise in turn when the time set in the program is multiple. LEDs in the outer circle flash in different colors. When exposed to players, all LEDs often blink purple.

In this mode, the impact also occurs on players of all teams.

Since during activation one of the commands is distributed in random order: "Double lives", "Arsenal" (the magazine is completely filled) or "Medkit" (health unit is added), the SIRIUS station in the "Random" mode can be used in scenarios with anomalous zones - an element of unpredictability will add interest to the game.

"Base" mode - the indication is similar to the "Respawn" mode, i.e. if the base is red, then the central LEDs glow red. The difference is that they do not blink like in "Respawn", but glow constantly. The outer circle in white also displays a timer. When commands are issued, all LEDs often flash purple.

When activated, the device gives out two commands at once - "Respawn" and "Radiation". Moreover, the impact on teams is made in different ways - if the team of the Reds is selected in the program as the "mistress" of the base, then only this team will be respawned, and the rest will be affected by "Radiation". As in the "Respawn" mode, SIRIUS in the "Base" mode respawns only "killed" players.

To deactivate a foreign base, it is necessary to shoot a certain number of times in the scenario settings. Hits are indicated by the frequent flashing of all LEDs in blue. After deactivation, the central LEDs often flash, and the external LEDs display a countdown timer until self-healing.

The "Base" mode is one of the most popular in scenario laser tag games. Based upon the name, the device in this mode is installed on the team bases in scenarios with a limited number of health units and ammunition. Moreover, it protects itself from deactivation by players-opponents.

Indication in the "Bonus" mode is as follows: the outer circle of LEDs shimmers in a rainbow clockwise, the center ones do not glow. The mode differs from others in that there is no automatic distribution. The impact on the player (double health units) occurs only after a shot at the device. Distribution is accompanied by frequent flashing of all LEDs with the color of the team of the player who fired.

Bonuses are distributed to all players, regardless of the team color.

In the program, you can set a limited number of distributions of bonuses, after which the device pauses and resumes its work after the time set in the program. During inactivity, only the central LEDs shimmer with a rainbow.

The device is configured and controlled from the ARENA program for PC via the Wi-Fi channel: Game modes/Scenario selection/Edit scenario/Additional equipment/SIRIUS settings (see chapter 10.1.1. of this manual).

The procedure for flashing the microcontroller of the SIRIUS station is described in chapter 11.3.

7. Multistation

The Multistation (MS) is a multifunctional additional device for playing laser tag which significantly increase the list of possible scenarios.

The main advantage of this device is the availability of the LED screen (panel 192x192 mm, 1024 pixels), which clearly shows the mode the station is being used in. Also, thanks to a futuristic design, interactive animation and side lighting, Multistation makes the games more colourful and spectacular and becomes an adornment of any platform.
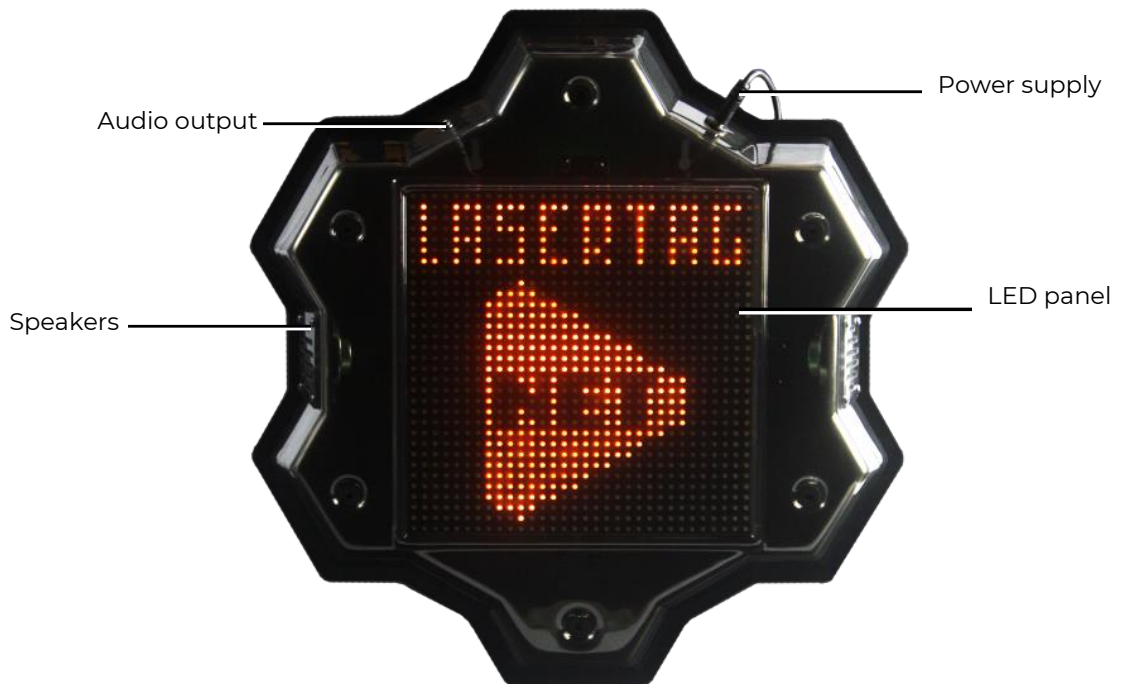
External Elements of the Multistation

Power supply: 220 V network via 8.4 V 2 A.

Sound: built-in speakers + audio output.

The Multistation is inherently the development of a standard laser tag device - the Utility Box. But besides this, it acquired the functions of a Domination Box, an Electronic bomb and a Base.

In the current release, the Multistation can work in seven modes: Medical Kit, Arsenal, Respawn, Bomb, Check Point, Radiation and Base.

When the game round starts, on the LED screen of the Multi-station, instead of the company logo, a picture appears showing in which mode the device is operating. Moreover, the screen, like the device itself, is interactive and can respond to the actions of players.

In the "Medkit" mode, health units are distributed over the IR-channel with the interval set in the settings. Moreover, at the time of activation, the image of the red cross changes on the screen.
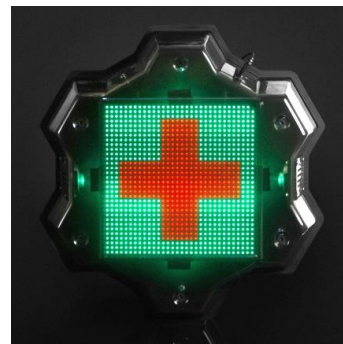
In the program, you can set a parameter when the effect is made on one, two or all teams. The mode is used in "survival" scenarios with a limited number of health units.

In the "Radiation" mode, at given intervals, health units are taken away. In this case, the standard radiation sign makes a turn on the screen.

Also in this mode, you can set which team the device affects.

In this mode, the Multistation is best used in scenarios with artifacts.

In the "Respawn" mode, the Multistation restores the number of health units and the ammunition of the kit to the starting state.
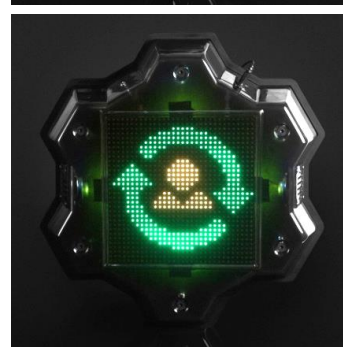
It is valid only if the player at this moment has no health units left. At the moment of activation, a silhouette of a person flashes on the screen. Just as in previous modes, you can choose which team players will respawn the device.

The mode is used in many scenarios with a limited supply of health units and ammunition.

In the "Arsenal" mode, cartridges or clips can be replenished in one of the ways - by waiting for the automatic distribution or by firing from the blaster into the device (can be configured). At the same time, in the clips shown on the screen, the upper cartridge is sent to the chamber, and two lower ones rise in its place. After using the third cartridge, the "conveyor" loads the next package of ammunition.
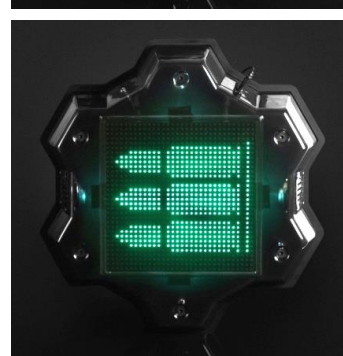
The mode is used in "survival" scenarios with limited ammunition.

The "Bomb" mode allows you to conduct scenarios that resemble one of the episodes of the computer game "Counter-Strike". Namely, "Bomb Defusal". Starting with the multistation firmware version MS_v2.1.14, the mode functions in a new format.

Initially, players are divided into two teams - miners, who set the bomb and sappers, who must disarm it.

Simplified scenario of a game using Multistation in the "Bomb" mode is as follows:

- A team of miners sets a bomb with shots the number of which is set in the program. The team of sappers at this time is trying to prevent this, hitting the players of the miners team. The dynamics of the installation can be observed on a progressive scale at the bottom of the screen of the Multistation. Moreover, the device does not respond to sapper shots.

- If during the game round the installation did not complete, or the bomb did not explode, the victory is awarded to the team of sappers.
- If a bomb was installed, the speaker of the Multistation reports: "Bomb has been planted" and the timer starts, which is graphically displayed on the screen as a burning wick of an old grenade. The "wick" is lit in proportion to the time set in the "Clock work" field. Now tasks of the teams become diametrically opposed - the team of sappers needs to disarm the bomb during the timer work, hitting the device (shots are also controlled by the lower two rows of screen LEDs), and the miners must counteract this by hitting the opponent. Accordingly, the station now does not respond to shots from miners.
- The following are two options. The sappers manage to disarm the bomb, and it returns to its original state - the message "Bomb has been defused" sounds and the ring with a crosshair appears on the screen again. Or the bomb explodes.
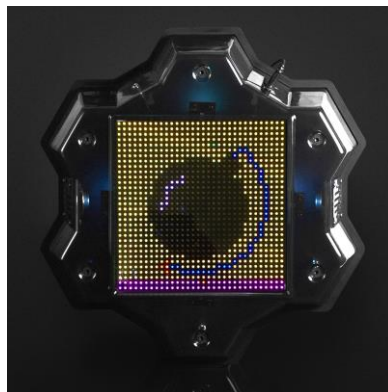
One of the most popular additional laser tag devices is the "Domination Box". The Multistation can work in this mode. But the device's functionality as such takes into account the specifics of the indoor laser tag.

When the round starts, a white target-ring appears on the screen. When a blaster beam hits the device, a color circle of the player's team appears in the center of the screen. On subsequent hits by players of the same team, the circle will increase. The circle growth dynamics corresponds to the value "Number of shots for activation/deactivation" set in the program, i.e. if 5 units are set, the circle will fill after 5 shots, if 20 - after 20.

If a player of another team hits the device, a circle of color of the second team appears in the center (the circle of the first team does not reset) and with subsequent shots the circle of the new team begins to increase in size.
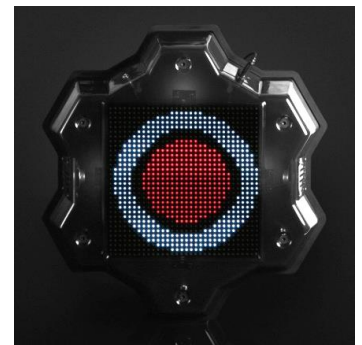
The task of the players is to fill the entire circle with the color of their team first, after which the point is considered captured and only after that points will be awarded to the capturing team (1 point in 1 second of retention).

After the capture, the task of the players of other teams is to intercept the point. By firing shots at the device, they fill the circle with their color, and players of the captured team reduce it with shots. If the other team nevertheless intercepts the point, then points accrue to it already.

In order to prevent players from accumulating near the Multistation operating in the "Domination Box" mode, you can set the "Radiation" parameter in the program (the distribution period and the damage done are also set in the program).

This mode can be used in scenarios with the option "The game ends ahead of schedule if one of the teams scores the set number of points" (Scenario editor/Scenario completion condition/Maximum points). At the same time, the game ends ahead of schedule with the victory of the team that scored the set number of points, and the image of the color cup of the winning team is displayed on the screen.

If the parameter of early termination is not turned on and the game ends in time, the team that scored the most points by this time wins. If two or more teams have equal number of points, the victory is awarded to the team that owns the point by the time the game timer stops.
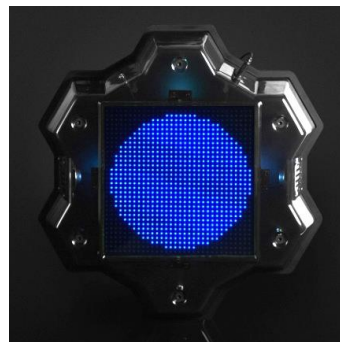
The mode "Base" has been added in the list of modes for additional devices comparatively recently. Its main difference is the respawn and radiation lesion of selectively players of teams of different colors. It is also possible to destroy (deactivate) the opponent's base.

After the scenario starts, an image of a waving flag of the team color appears on the screen of the Multistation. The LEDs of the side illumination also glow in the same color. At the time intervals set in the program, the device distributes the "Respawn" command via the IR channel, which restores the initial values of the health units and ammunition of the players of its team (it does not affect the "wounded"). With the same frequency, the Base distributes the "Radiation" command, which acts on players-opponents. With these activities, a corresponding picture appears briefly.

To destroy the opponents' base, you need to shoot at the device set in the scenario settings the number of times. In this case, the white bar at the bottom of the screen will graphically display the degree of destruction. After the strip reaches the right edge, an explosion animation is displayed on the screen and the crossed-out flag appears. From this moment, the Base is inactive.

If the option "The game ends head of schedule early if the Base is destroyed" is enabled in the scenario (Scenario Editor/Scenario End Condition/Base is destroyed), the game ends ahead of schedule with the victory of the team that destroyed the opponent's base.
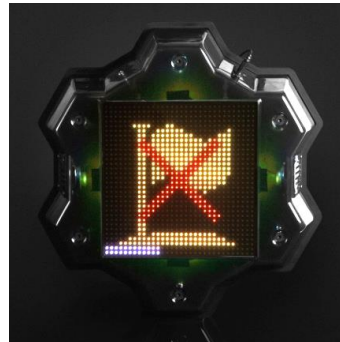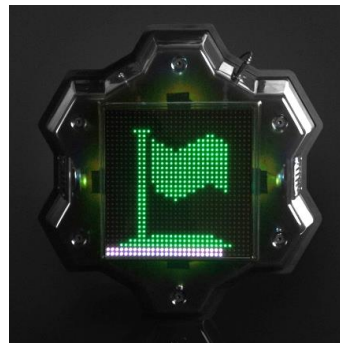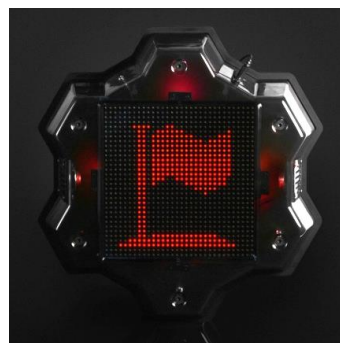
If this parameter is turned off, then after the time set in the "Inactivity period" setting (Scenario editor/Optional equipment/MS settings/Settings/Base) the database will self-recover.

The "Base" mode can be used in any scenario with a limited number of health units and ammunition.

The device is controlled from the ARENA computer program via a Wi-Fi channel. The Multistation setup is described in chapter 10.1.1. of this manual.

The firmware of the microcontroller is updated using the BootLoader program (chapter 11.4.).

8. Equipment Configuration

It is better to begin configuration of the equipment for indoor laser tag, manufactured be the company, with the connection a router to the server.

The router comes fully configured and does not require additional settings. If, for some reason, the device settings are reset (for example, you pressed the Reset button by a mistake or made changes to the settings that led to the incorrect router work), you should configure it yourself (on the example of the firmware of the Totolink router).

8.1. Manual router configuration in case of accidental reset

1. Check and, if necessary, set the computer to automatically obtain an IP-address.
2. For automatic configuration, obtain the configuration file of the totolink_config.dat router from the technical support of the company and save it in any directory on the file system of your PC.
3. Through any of the 4 LAN connectors, connect the router to the network card of the computer using the UTP cable, which is included in the package.
4. Turn on the router.
   In any browser (Opera, Google Chrome, Internet Explorer) installed on the computer, enter 192.168.1.1 in the URL input line.
   If 192.168.1.1 does not open, you should reset the router to the default settings - on the front panel of the router, press the RST-WPS button for 15 seconds, and then release it. Repeat opening the router settings page.
5. On the back of the router, read the password from the sticker set by the company's QC, for example:

Login: admin
pass: 3WH9AZT70
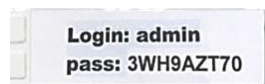
6. In the window that appears, enter User Name: admin, Password: from the sticker.
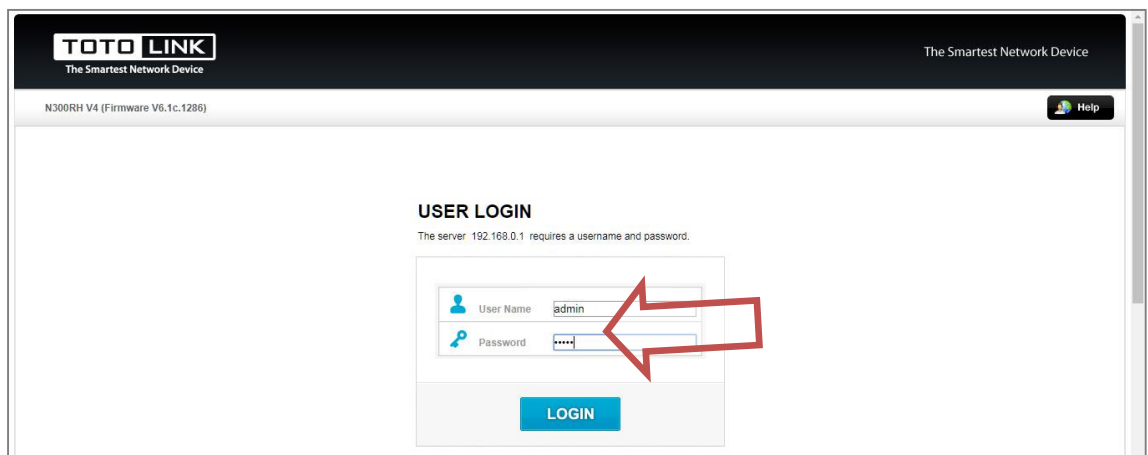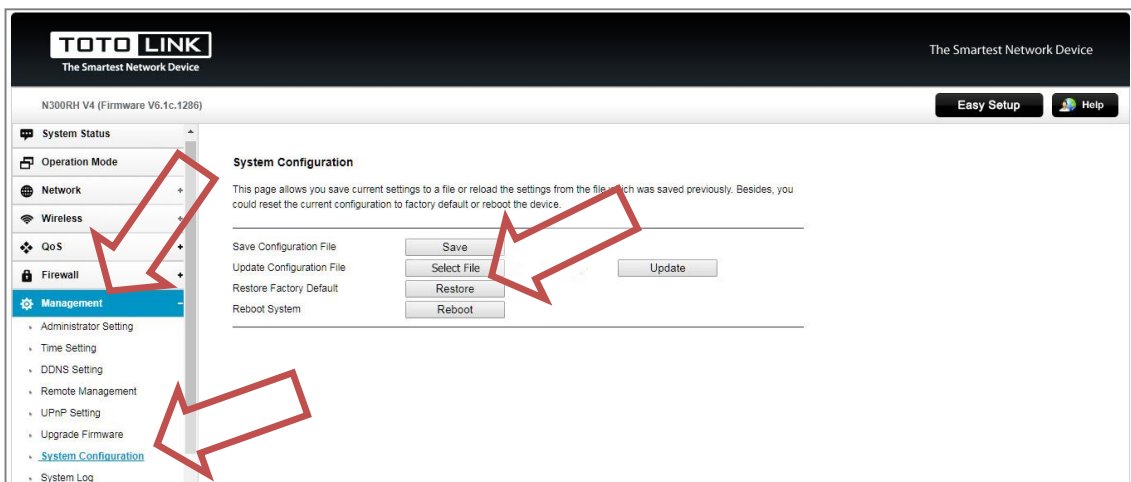

7. In the Easy Setup window, select the Advanced Setup mode.
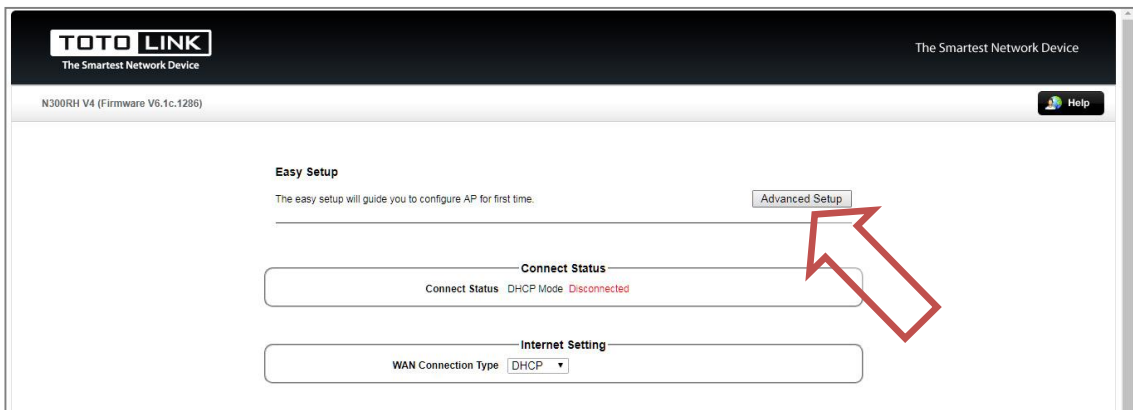
8. For automatic setup:
   - In the window that appears, select the menu item Management/System Configuration.
   - Select the item Update Configuration File and press the button "Select file".

   - Select the saved settings file in the file system of the computer and click the "Update" button. After about 65 seconds, the router will reboot with the new settings and the address 192.168.0.1.

9. For manual setup:
   - In the menu item Operation Mode, select the item Gateway Mode and click on the "Apply" button.
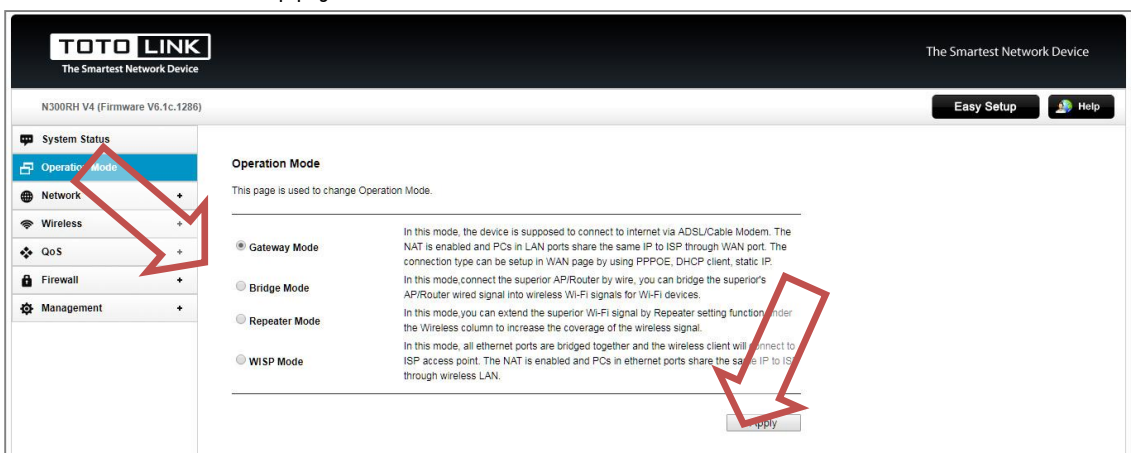
   - In the Network menu select LAN Setting and set the parameters:

   IP Address (IP-address of the hotspot) - 192.168.0.1;

Subnet Mask - 255.255.255.0;
Start IP Address (initial IP address range of the server)-192.168.0.102;
End IP Address (the end range of the IP-address of the server) - 192.168.0.204;

- Click the "Apply" button to apply the entered settings.
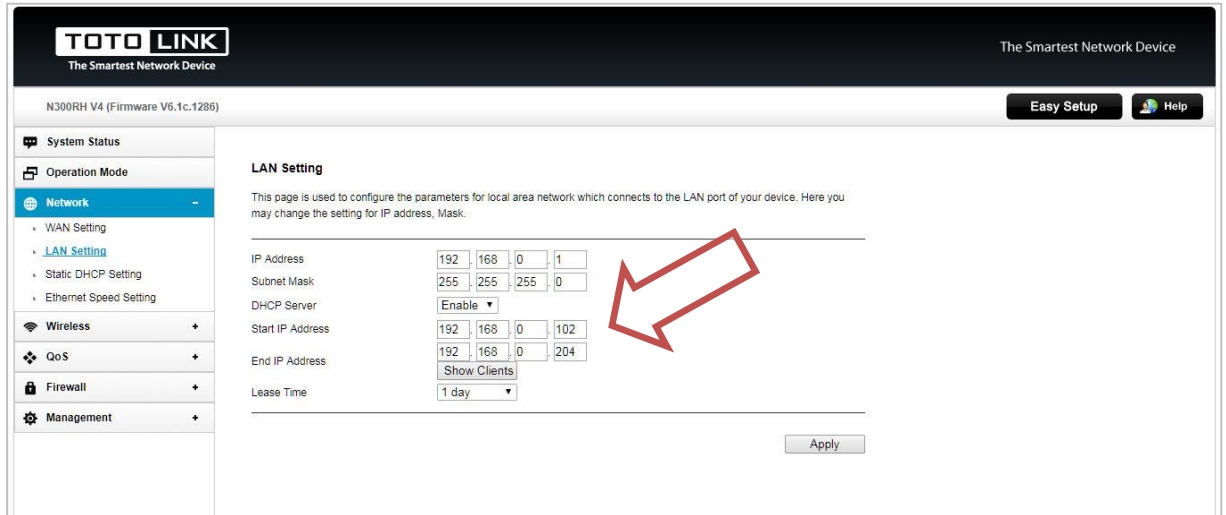
- In the Wireless menu, go to the Basic Setting item and install:

SSID (hotspot name) – LASERTAG[1];
Encryption - WPA2-PSK;
Encryp Type - AES;
Key (password to the hotspot) - 2015LT2015;

- Apply the selected settings using the "Apply" button.
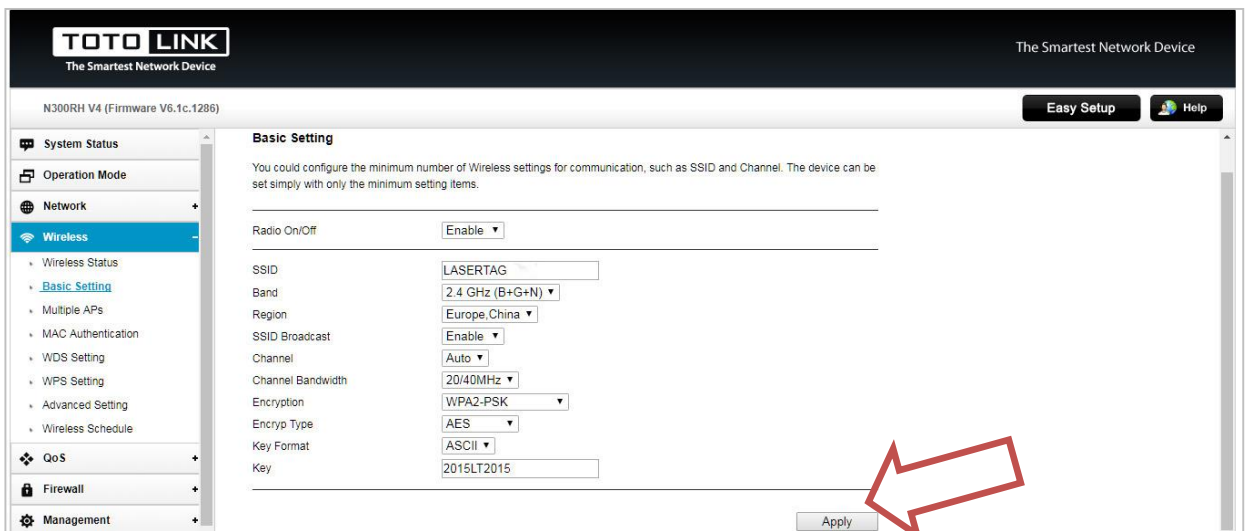
After this, you should configure the local network (by the example of Windows 10).

8.2. Local network setup

1. Through any of the 4 LAN connectors, connect the router to the network card of the computer using the UTP cable, which is included in the package.
2. Install the antennas in an upright position.
3. Turn on the router.

---

[1] The equipment produced by the company allows up to 5 different hotspots, each with its own password. Information on setting up can be obtained by contacting technical support.

4. In the Toolbar, left-click on the network status icon and left-click on the inscription "Network and Sharing Center":
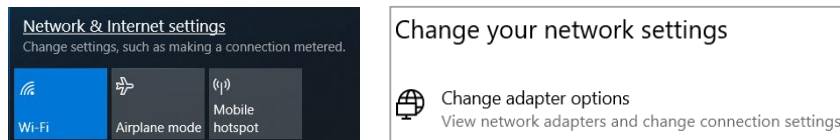
5. In the window that appears, click on "Change adapter settings".
6. Move the cursor to the "Local Area Connection" icon and click the right mouse button.
7. Click on the "Properties" button.
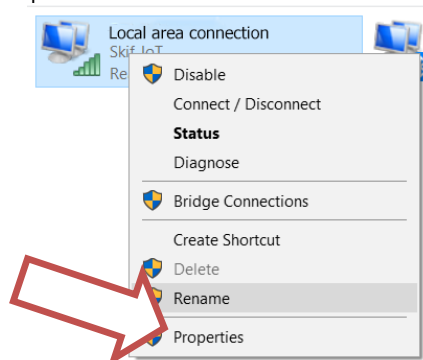
8. Select the line "Internet Protocol Version 4" and click the "Properties" button.
9. In the "Properties: Internet Protocol Version 4 (TCP / IPv4)" window, set the parameters:
   IP Address: 192.168.0.101
   The Subnet Mask should be determined by itself: 255.255.255.0
   Default Gateway: 192.168.0.1
10. Leave the remaining fields blank.
11. After all parameters are entered, click "OK" in the Protocol Properties and "Close" in the Connection Properties to save the settings.
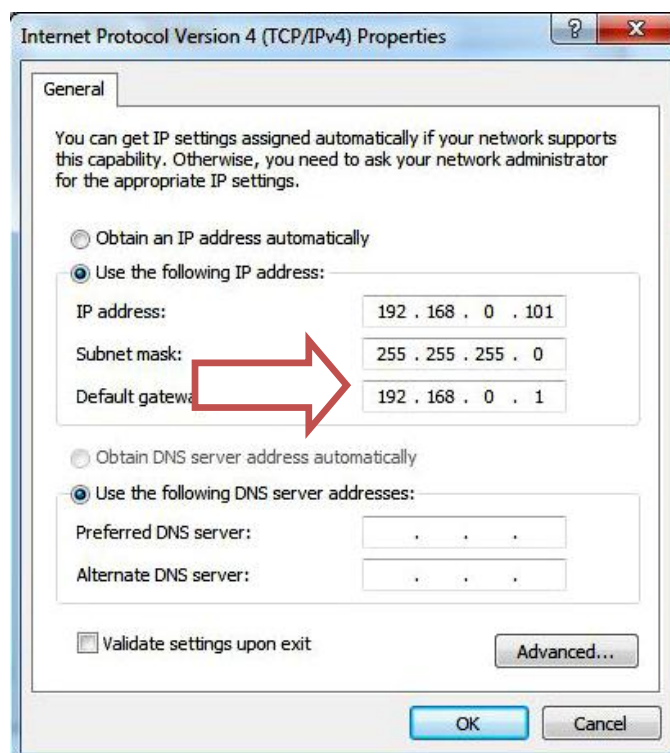
Local area network protocol setting in Windows 10

The next stage in equipment configuration for the Arena laser tag is software installation.

9. Arena Software Installation

To configure the equipment of the arena laser tag manufactured by "Lasertag Net", and to control the game process, the ARENA program is designed , the latest version of which can be downloaded at: https://lasertag.net/support/ (Section "Indoor"/ Software for Windows/ Program for managing and configuring kits and additional devices)

Recommended computer requirements:
Processor Intel Core i5 2.8 GHz.
Operating System: Microsoft Windows 7 with updates SP1, Windows 8.x. or Windows 10 (run as Administrator).
RAM 8 GB.
Video card Nvidia 9800 GT 1GB AMD HD 4870 1GB (DX 10, 10.1, 11).
A monitor with a resolution of at least 1280×720.
Free space on hard disk - 1Gb

Recommended computer requirements are determined by the simultaneous uninterrupted operation of a large number of kits and additional devices with controlling, exchange and processing of data by the control program, as well as the parallel transmission of statistics to external screens.

ARENA program is supplied in a portable version and does not require installation on the computer's hard drive to run it - just copy all its components to the selected directory and run the ARENA.exe executable file.

When starting the software for the first time, the Windows security system may request access permission to open PC network ports. In such a case, it is necessary to grant such access. Besides, Antivirus programs may regard this permission as a virus attack; thus, add ARENA software to the list of selected programs.

In Win10, the program must be run from Administrator`s login!

10.   Gameplay management

After running the program, the main window is loaded:

Program menu

Center panel

Gaming device status bar

Scenario selection and settings panel

Scenario: BASE ASSAULT

Scenario selection

Assign players to teams randomly   Remove all players from teams
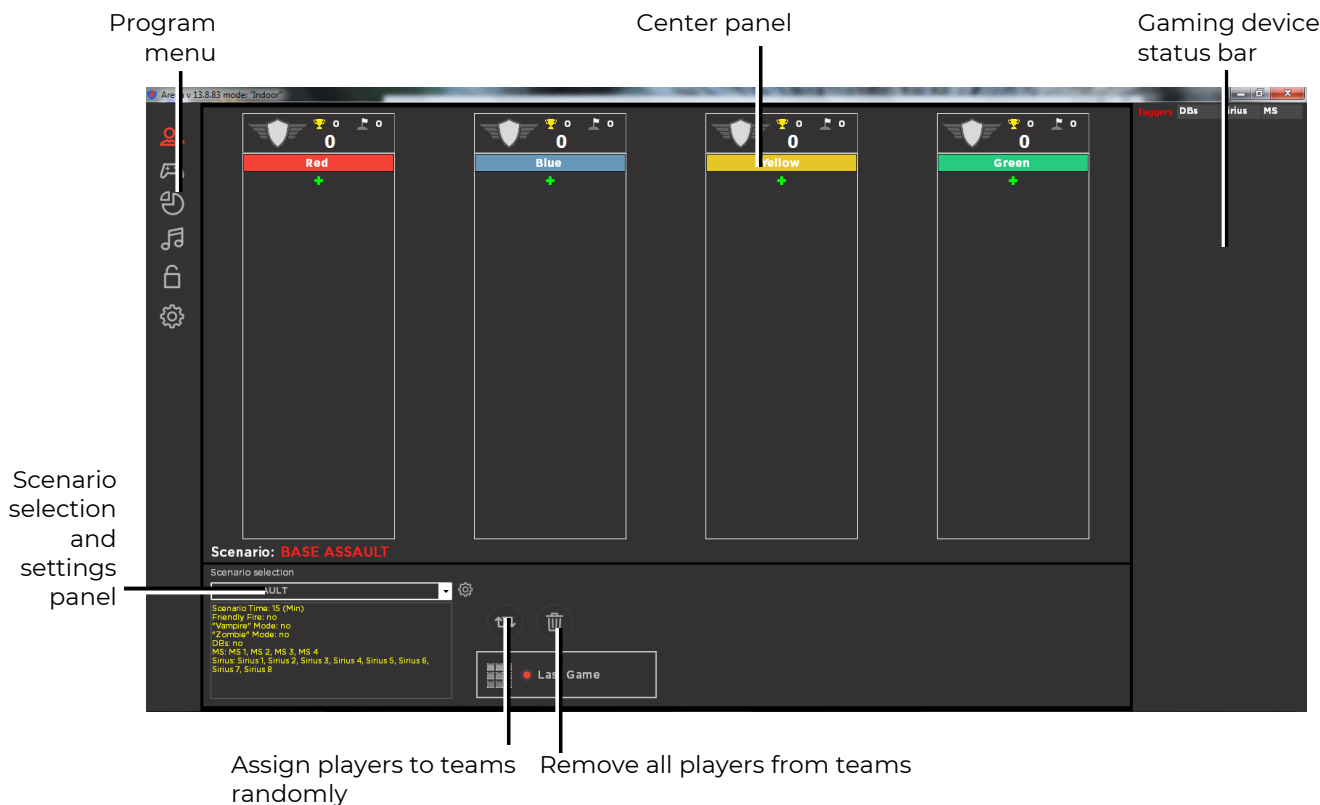
The start window of the Arena program

The program window is divided into three parts - the <u>left panel</u> - the program menu, the <u>central panel</u>, which changes depending on the selected window mode, and the <u>right</u> panel, which contains information about the status of the kits and devices involved in the game.

<u>The menu</u> is located on the left side of the program window. To select the window mode of the central panel, you must move the cursor to the desired icon and click the left mouse button.

There are only six modes: "Game scenes", "Game control", "Game statistics", "Sound and music settings", "Fiscal statistics" and "System settings".

The start window, or clicking on the icon   [icon]   puts the central panel in the <u>game scene mode.</u>

10.1.   Game scenes

In this mode, the central panel consists of two parts - the top displays the columns of the teams participating in the script, the bottom allows you to select and edit the game scenario for the upcoming game.

<u>The team columns</u> on the screen allow you to form and visually control the composition of teams for the upcoming game. In each of them there are lists of players indicating the identification number of the kit (ID) or, if assigned, the player's nickname.
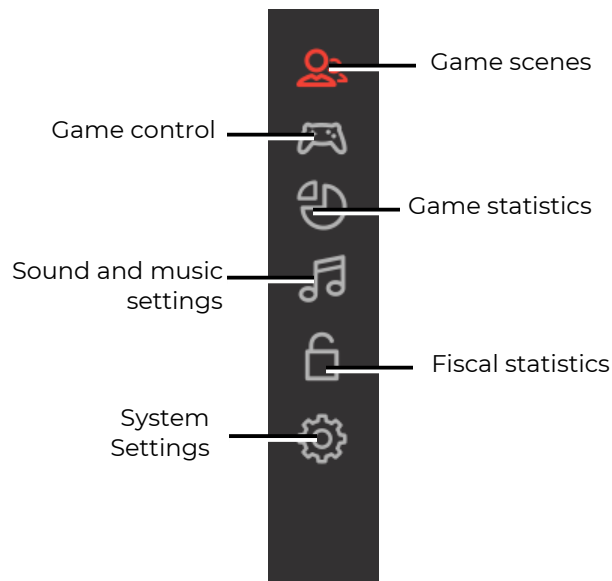
Program menu

The lower part of the panel primarily displays the name and main parameters of the current scenario.
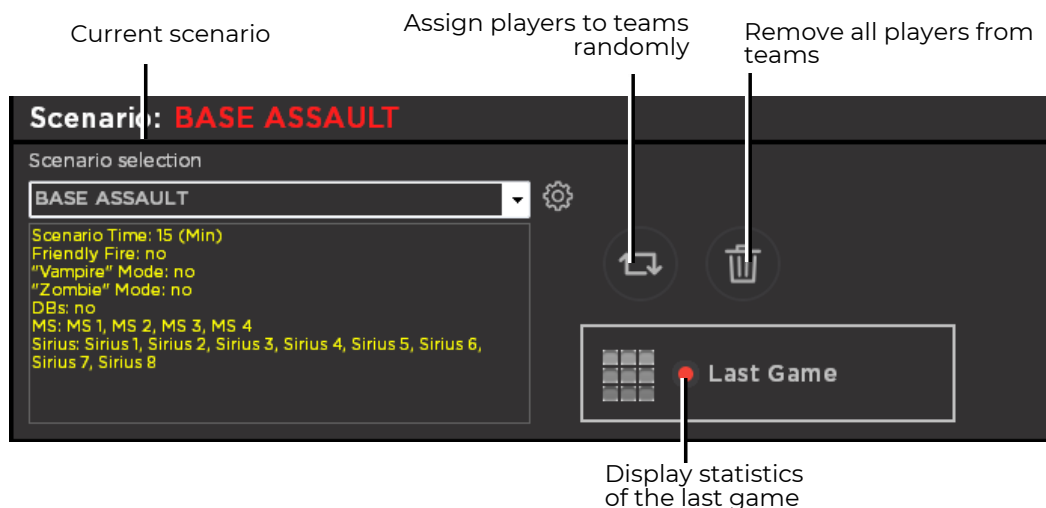
Scenario Selection Panel

This panel contains buttons for editing the distribution of players by teams. By clicking on the button ⟳ , you can distribute the players in teams randomly. If necessary, you can adjust the allocation.

Using the button 🗑 , all sets are deleted from the team columns at the same time.

The panel also has a button for displaying statistics of the last game on the screen of an external monitor or TV. This allows you to quickly compare the results of the recently held game and the previous one.

When you turn on the program, one of the scenarios is displayed on the bottom panel - the name in the window and its brief characteristics: duration, type of game and additional devices used in the scenario.

To select another scenario, click the left mouse button on the triangle in the window with the name of the scenario.

❗ **A program loaded with operator privileges does not allow you to select a scenario.**

27
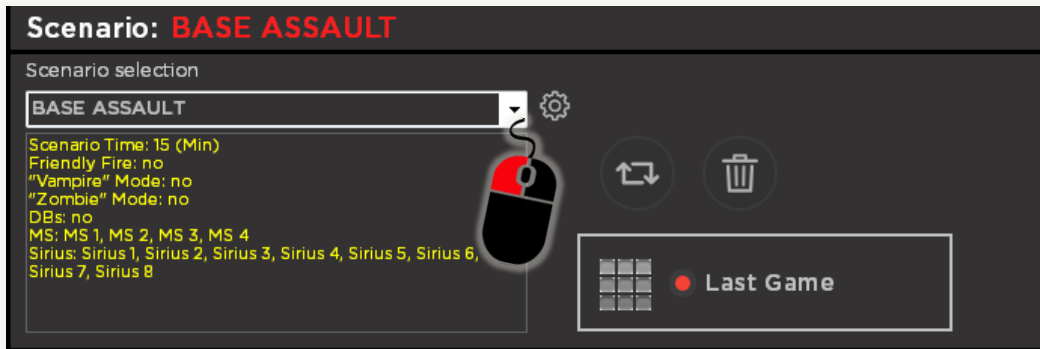
How to choose another scenario

From the drop-down list, if necessary, scrolling the slider, a standard, previously edited or user-created scenario is selected.
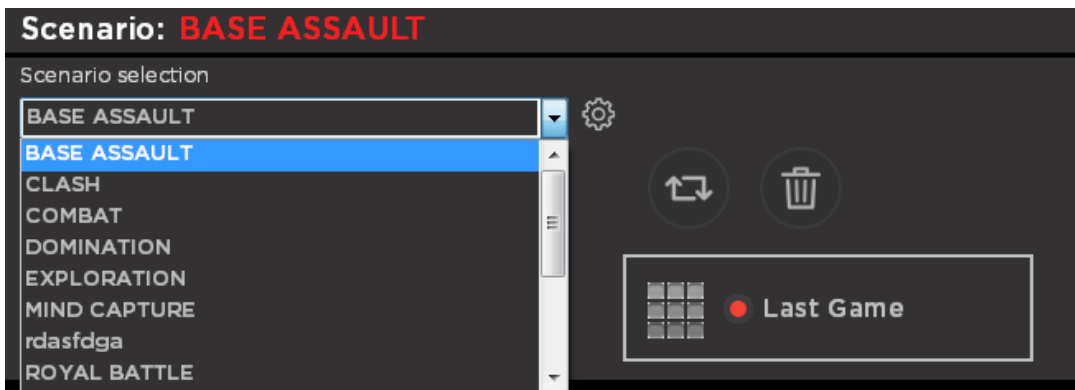
Scenario selection

Each of the built-in scenarios can be changed, and it is also possible to create your own custom scenarios. For this, the program has a scenario editor. To go into it, you need to click on the button ⚙ to the right of the scenario name:
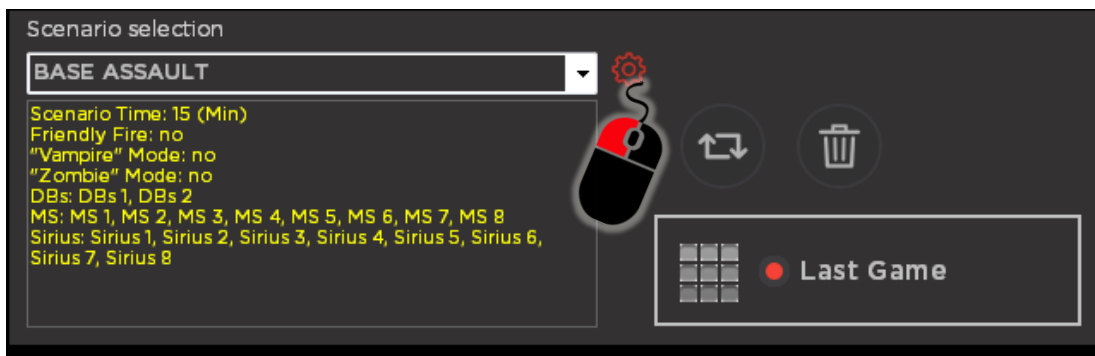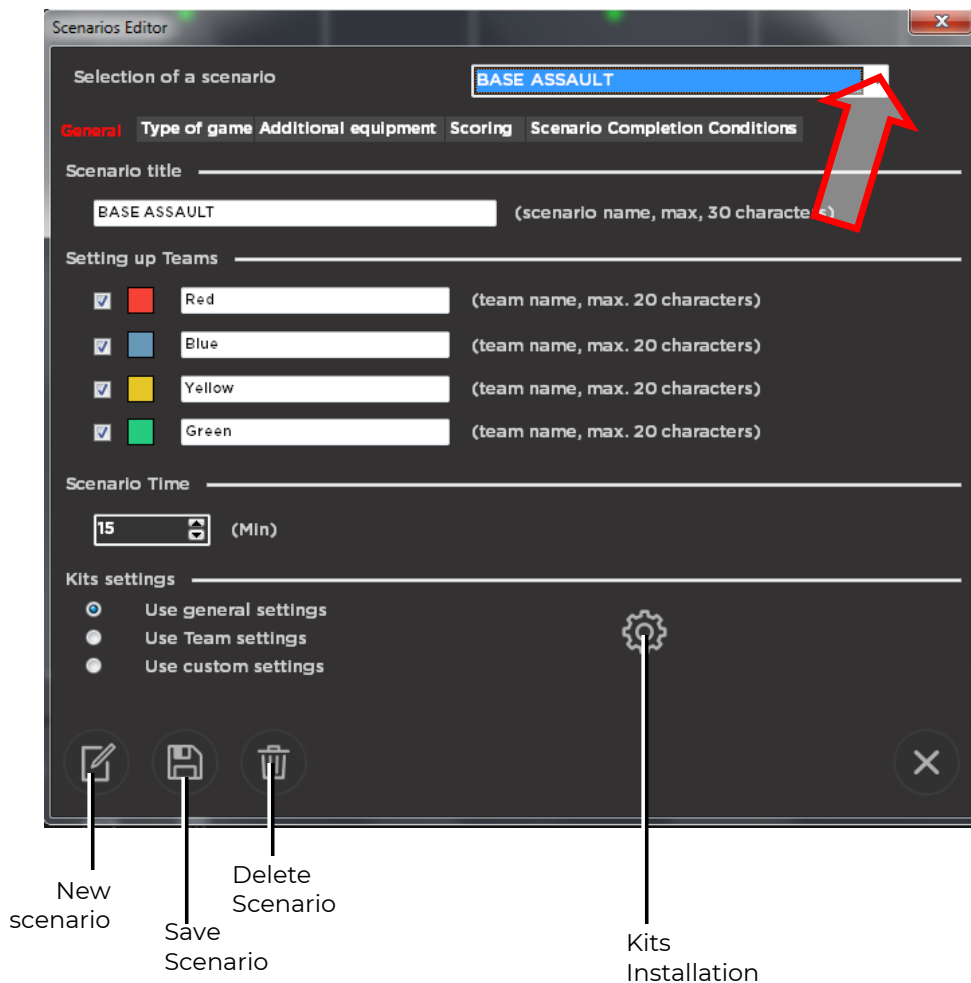

How to go to the scenario editor

10.1.1. Scenario editor

The scenario editor window is divided into 5 tabs: "General", "Game type", "Additional equipment", "Scoring" and "Conditions for completing the scenario"

ⓘ **The editor is available only when loading the program in the "Owner" or "Administrator" mode.**

Changes to scenarios take effect only after you press the button "Apply" after editing any parameters, and after closing the opened windows you click the button "Save scenario".

To create a new scenario, click on the "New Scenario" button.

To delete any of the existing scenarios, you must first select its name in the "Select a scenario" drop-down list (at the top of the window), and then click the "Delete scenario" button.

Scenario Editor Window

To edit an existing scenario, you must first select it in the drop-down list and then proceed directly to change the parameters.

In the "General" tab you can change the name of the scenario, the number and colors of the teams participating in the game, as well as the duration of the round.

At the bottom of the window is the "Kits Settings" section. Here you can choose which settings to use in the scenario: general (when the settings are the same for all kits), team (the settings for each of the teams are different, but inside the team are the same) and individual.

29

To edit the kit settings, click on the button ⚙ to the right of the setup type selection buttons. Then select and click on the type of setting (general, by teams or individually for each ID).

It is possible to modify next parameters:
- Power of blaster IR beam is set out depending on a premise and obstacles, which are reflected in shooting and ricochet burst distance (1-100%).
- The volume of sound effects playing by the blaster speaker - moving the slider you can set the desired level from 0 to 100%.
- Amount of health – health units (1-999).
- Period of player survivability after it has been hit (1-25,4 c).
- Duration of shock – standby unattended time of player's blaster after it has been hit (1-25,4 c).
- Time until auto-respawn after a player's defeat (1-254 s), 0 - off.
- Unlimited cartridge clips (yes/no)
- The number of clips if the "Endless clips" option is disabled (1-254 pcs).
- Amount of cartridges in a holder (1-254 pcs).
- The ability to switch the shooting mode on the blaster (single, burst or endlessly) by holding down the reload button for 10 seconds (yes/no).
- Rate of fire (1-999 rounds per minute).
- The number of shots in a round when holding the trigger (1-254).
- Reload time (1-25,4 c).
- Damage dealt per shot (1-100 units).
- Auto-loader (yes/no).
- Capacitive hand sensor (yes/no).

Next, the program sets up the affected area (so-called differential damage). You can set the following values:

- Chest (0-300)
- Back (0-300)
- Weapons (0-300)
- Weapon damage, sec. (0-254), 0 - the parameter is turned off.

In addition, the following parameters are also displayed in the window:

- Round time on the OLED-display (yes/no).
- Player's position on the OLED display (yes/no).
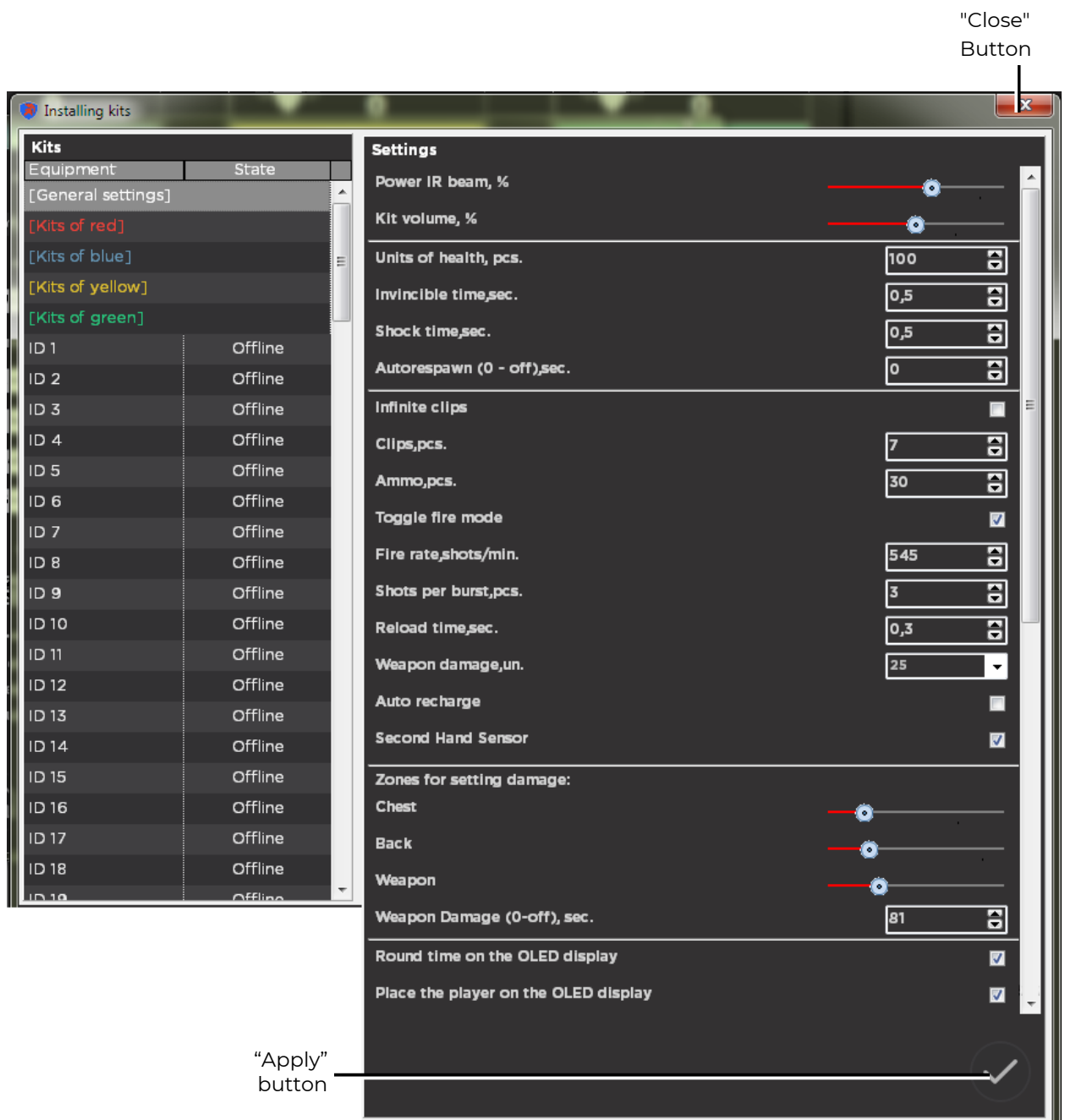
Kit Settings Window

To save changes, at the end of editing, click on the "Apply" button ✓. The same button can be pressed to save changes to only one of the parameters.

To exit the window, click the "Close" button in the upper right corner.

If "Use individual settings" is selected in the scenario, then there is the possibility of <u>accelerated access</u> to the settings of a specific kit. Just right-click on the kit cell in the status bar of gaming devices, and in the window that appears, select the "Settings" item.

The <u>"Game Type"</u> tab allows you to enable or disable the specific settings of kits. So, if you enable the "Allow friendly fire" option, then players can hit each other, regardless of the color of the kit. This type of game is used in scenarios such as "Every man for himself" or "Vampire". And in the scenarios "Team game", "Domination box capture" or "Capture base", this parameter is usually disabled, i.e. players of one team do not hit each other.

In the "Zombie" mode, players who are in one of the teams ("Zombies"), when they get into the sets of players of the other team ("Hunters"), "repaint" them in their color, i.e. turn also into zombies. Alternatively, in this mode, you can set the condition for the early completion of the scenario "There is only one team left" - either they struck all the zombies, or turned all "Hunters" into "Zombies".

The inclusion of the "Vampire" mode allows the player, when hitting an opponent, not only to take health units from him, but also add them to himself.
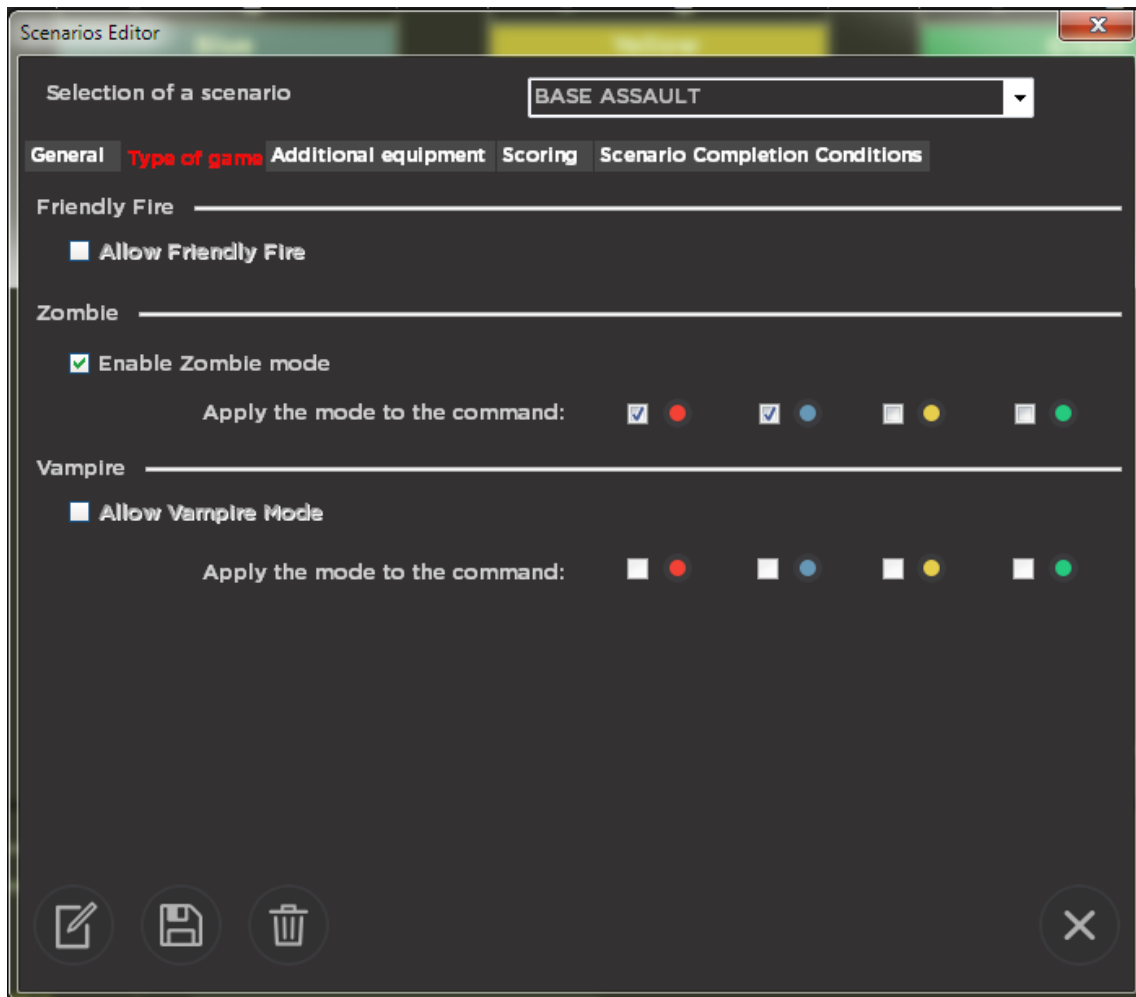
Game Type Selection Tab

The next tab is "Additional Equipment". In the tab, you can select the equipment that will participate in the edited scenario.

The program supports the use of up to 4 Smart Domination Boxes in the game and 8 Multistations and SIRIUS Stations each.
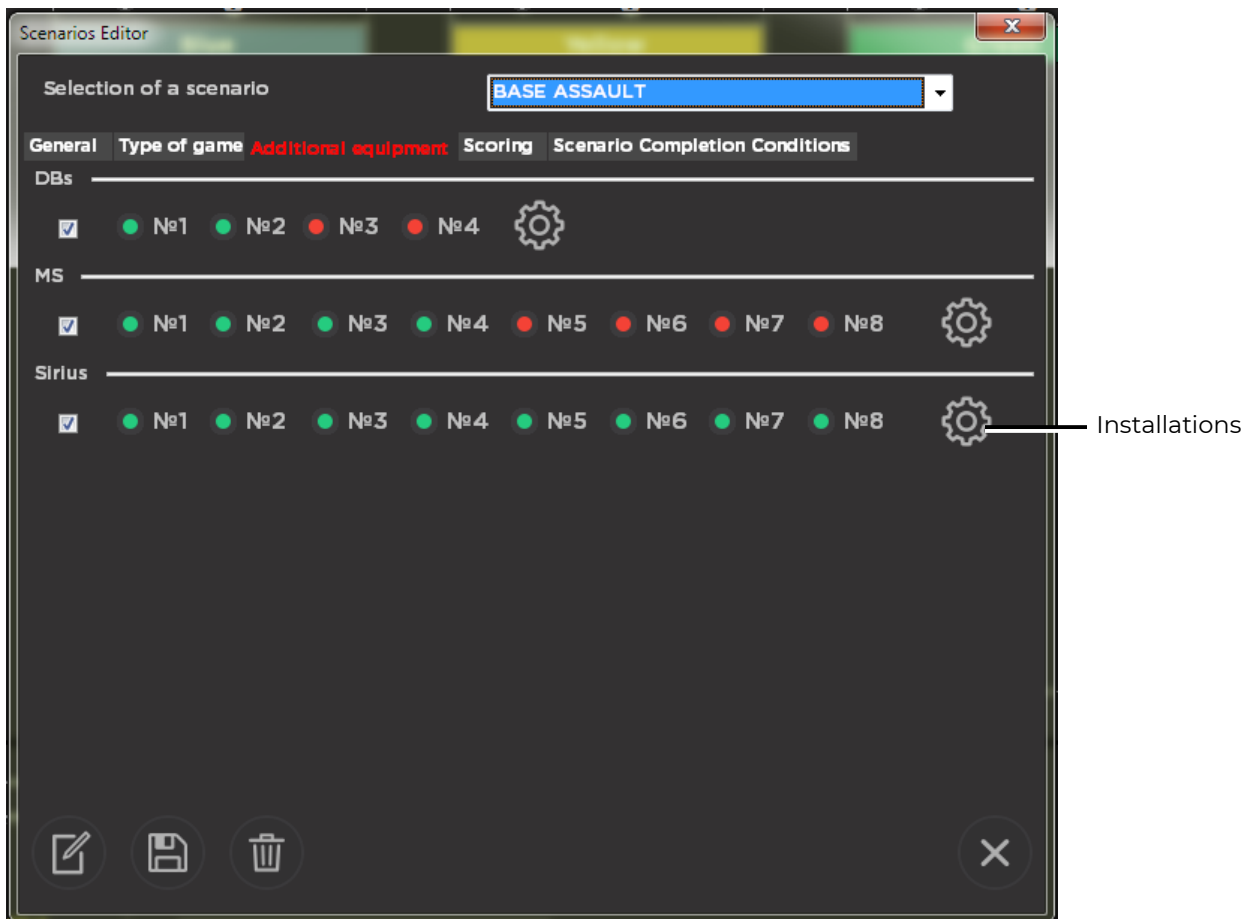
"Additional Equipment" Tab

To add any type of device to the scenario, you must first select the radio button in the corresponding section. At the same time, buttons with device numbers will become active. A green dot on the button indicates that the device is involved, a red one indicates that it is not used. By clicking on these buttons you can adjust the number and numbers of points and stations used in the scenarios.

When you click on the button ⚙, you can set the mode and parameters of each of the devices.

The "DBs Settings" window allows you to first select the display mode from the drop-down list for a specific Domination Box ("Capture for Time", "Capture by Shots", "Tug of War", "Triple Capture" or "Raise the Flag").

Further, depending on the selected mode, the parameters of the device's functioning in this scenario are set.
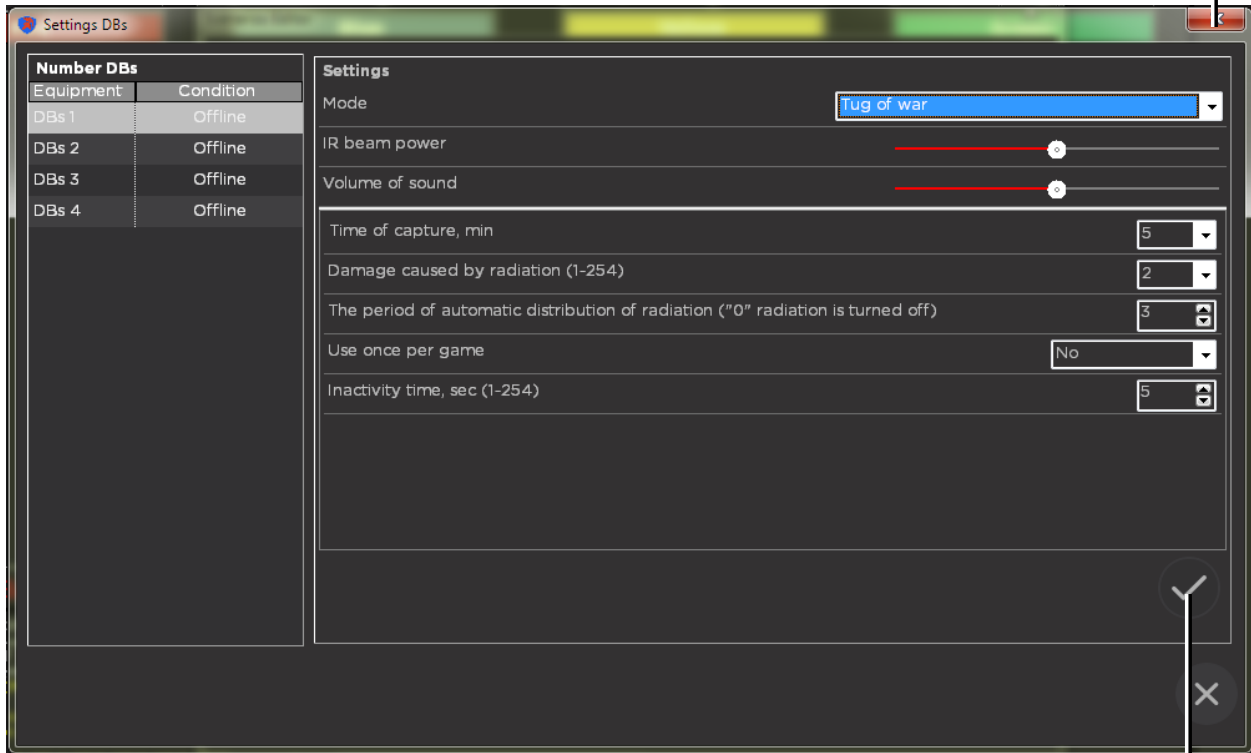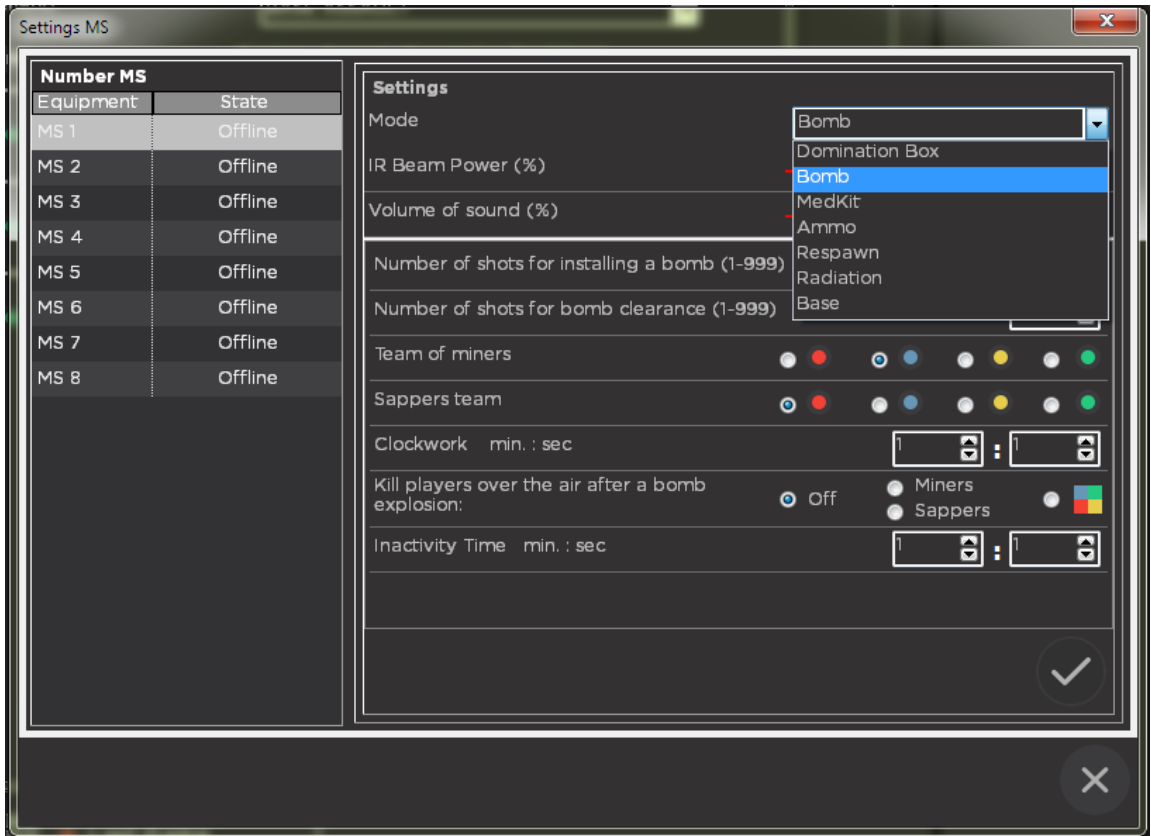
“Apply”
button

Smart Domination Boxes Settings

For Multistations and SIRIUS Stations, the device operating mode is selected in the drop-down list (a description of the modes is given in chapters 6 and 7 of this manual). In each of the modes there are both the same settings and the settings specific to this mode only. Moreover, in some modes, you can set which teams the device will affect when it is active.

Immediately after changing the parameter, or at the end of the entire editing, you must confirm the changes by clicking on the "Apply" button 〔✓〕 .

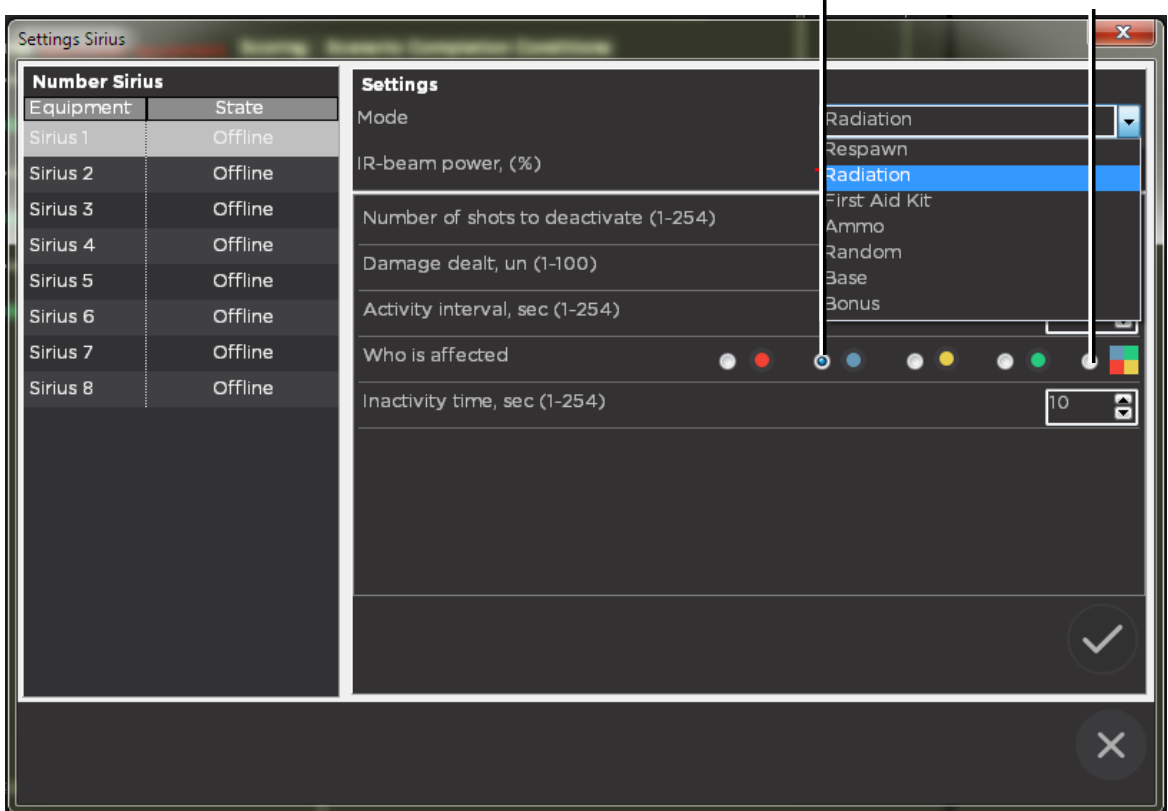To exit the installation windows, click on the "Close" button.

Settings MS

Number MS	
Equipment	State
MS 1	Offline
MS 2	Offline
MS 3	Offline
MS 4	Offline
MS 5	Offline
MS 6	Offline
MS 7	Offline
MS 8	Offline

Settings

Mode: Bomb

- Domination Box
- Bomb
- MedKit
- Ammo
- Respawn
- Radiation
- Base

IR Beam Power (%)

Volume of sound (%)

Number of shots for installing a bomb (1-999)

Number of shots for bomb clearance (1-999)

Team of miners

Sappers team

Clockwork   min. : sec   1 : 1

Kill players over the air after a bomb explosion: ⊙ Off   ○ Miners   ○ Sappers

Inactivity Time   min. : sec   1 : 1

Multistation Settings

Affect the blue team

Affect all teams

Settings Sirius

Number Sirius	
Equipment	State
Sirius 1	Offline
Sirius 2	Offline
Sirius 3	Offline
Sirius 4	Offline
Sirius 5	Offline
Sirius 6	Offline
Sirius 7	Offline
Sirius 8	Offline

Settings

Mode: Radiation

- Respawn
- Radiation
- First Aid Kit
- Ammo
- Random
- Base
- Bonus

IR-beam power, (%)

Number of shots to deactivate (1-254)

Damage dealt, un (1-100)

Activity interval, sec (1-254)

Who is affected

Inactivity time, sec (1-254)   10

SIRIUS Station Settings

35

The program also has the ability to accelerate access to the settings of additional devices: in the status panel of gaming devices, right-click on the device's cell and select the "Settings" item in the window that appears.

In the "Scoring" tab you can configure the accrual of points for players for various gaming events. The value can be selected from 0 to 100, both positive and negative. If the value is zero, the indicator is not taken into account in the calculation. For defeat and a shot, it is recommended to take points (so that the player does not shoot aimlessly).

"Close" Button
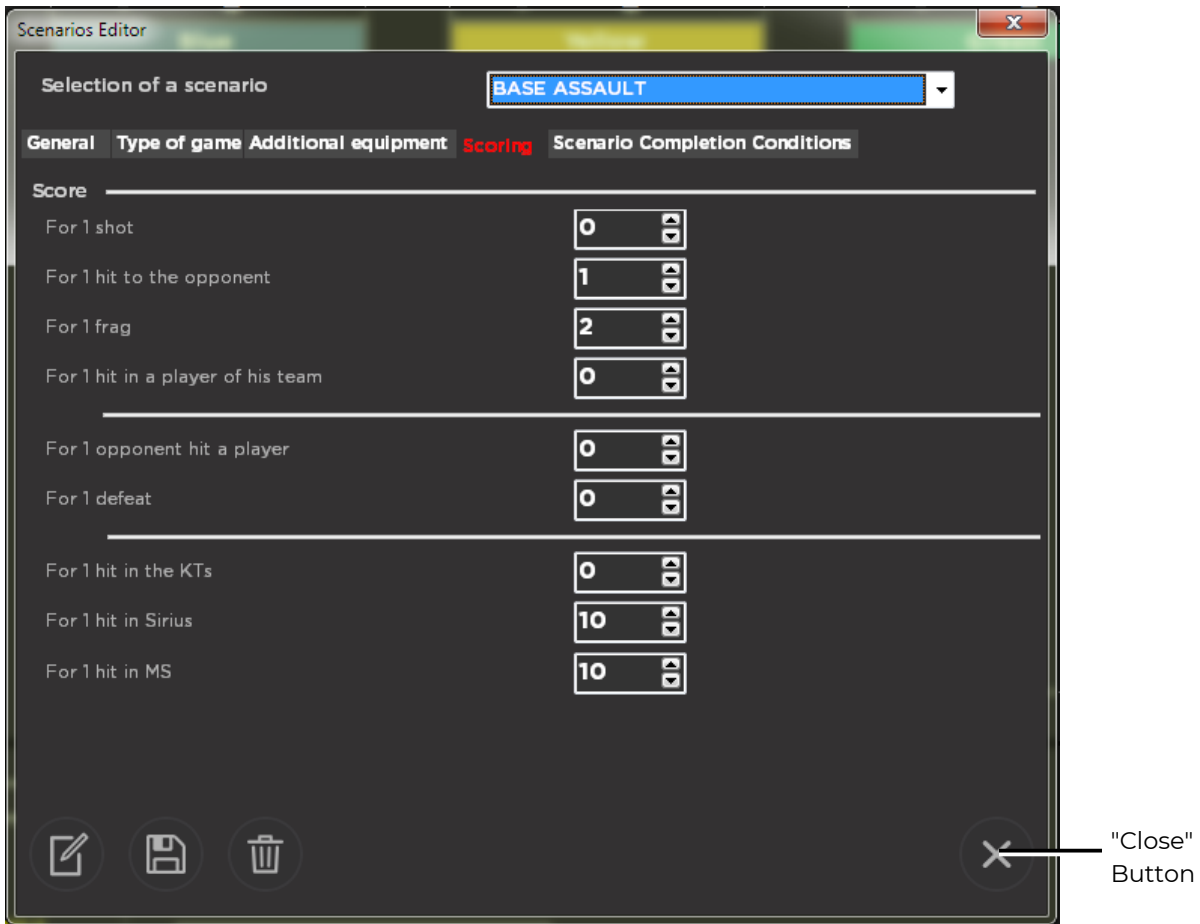
Scoring settings tab

The last tab of the "Scenario Editor" window is "Scenario Completion Conditions".

On this tab, you can choose under what conditions the round ends ahead of schedule, i.e. before the timer is triggered.

Scenario completion conditions may be as follows:

- *Capture of the Domination Box* (for DBs and Multistations) - you can set the number of captures to fulfill the condition, the retention time and the number of hits for capture;
- *Hits in SIRIUS* - a condition that is satisfied when one of the teams gets into the device a specified number of times. It can be used in a scenario with several stations (preferably more than 5), when players do not play against each other, but against the Arena. Stations are set in the "Radiation" mode with a different number of shots for deactivation and inactivity time.
- There is *only one player left* - the condition used when the "friendly fire" mode is on, when the players hit each other regardless of the color of the team;
- *There is only one team* left - a condition that can be used in a scenario like "Zombies" when players "repaint" their opponents.

- *The maximum number of points* is the end of the round when a specified number of points is gained by either a player or a team.
- *The base is destroyed* (for Multistation and SIRIUS) - the condition can be used in scenarios when the option "Base is not restored" after destruction is enabled.
- The *bomb is* detonated (for the Multistation in the program version from 13.8.83) - the condition is for the "Bomb" mode on the Multistation with the firmware version from MS_v2.1.14.
- The *bomb* is cleared (for Multistation in the program version from 13.8.83) - by analogy with the previous one, but the game ends when clearing, and not when the bomb explodes. These two conditions can be included individually or together.

"Close Editor" Button

"Save Scenario" Button
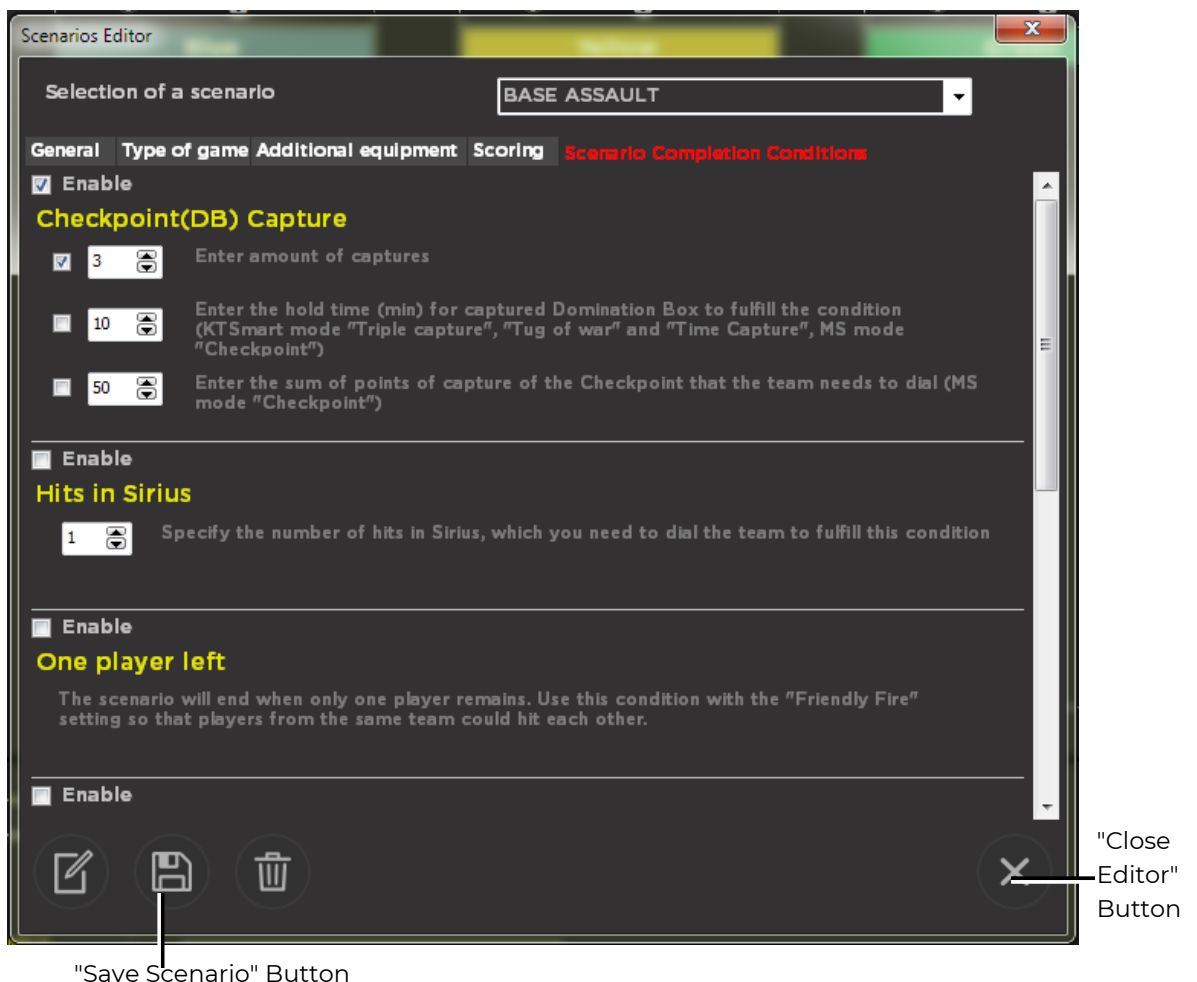
"Scenario Completion Conditions" Tab

After finishing editing the scenario, you must click on the "Save Scenario" button in the "Scenario Editor" window for the changes to take effect.

Close the window by clicking on the "Close Editor" button.

10.1.2. Players assignment

After the kits are connected to the server and the information about them in the status bar of gaming devices and selecting a scenario appears, it is necessary to assign the players to teams.

- The simplest method - is to drag the icon of connected kit into a team column of selected color. For this, it is necessary to select a location from kit ID in the game devices status panel (rightmost) and click by the right mouse button to the status icon 🛜 and, holding the button drag icon to a necessary column. Therewith, the blaster loud speaker produces a system signal and kit will change the selected color of sensors lighting. The kits may be "flipped" between the columns in the same way or be returned to the right panel.
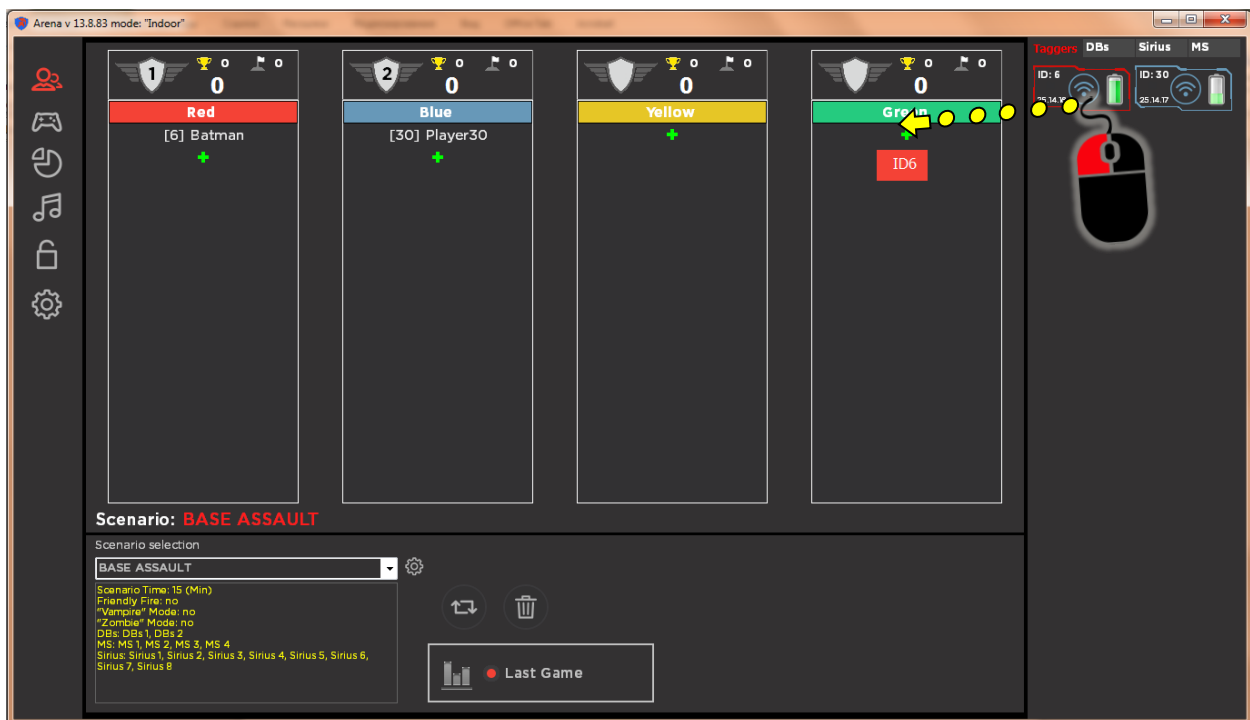
Assignment of players by teams applying Drag and-Drop

If using another method it is necessary to click on the sign "+" in the column of selected team by left mouse button. Window with a list of active currently and unengaged kits in other teams will appear. Left button click will add a player to the team when rollover to the selected kit ID. The procedure shall be repeated for remained players in the selected columns.

The players may be assigned automatically. For this, it is enough just to click the icon, and program will arrange players by teams at random. Arrangement may be coordinated, if necessary..

Click the right mouse button on the kit ID to remove the player from the column. In the window that appears, select the inscription "Delete" and click the left mouse button.

In this window, you can use the button 🗑 to delete all kits from the team columns at the same time.
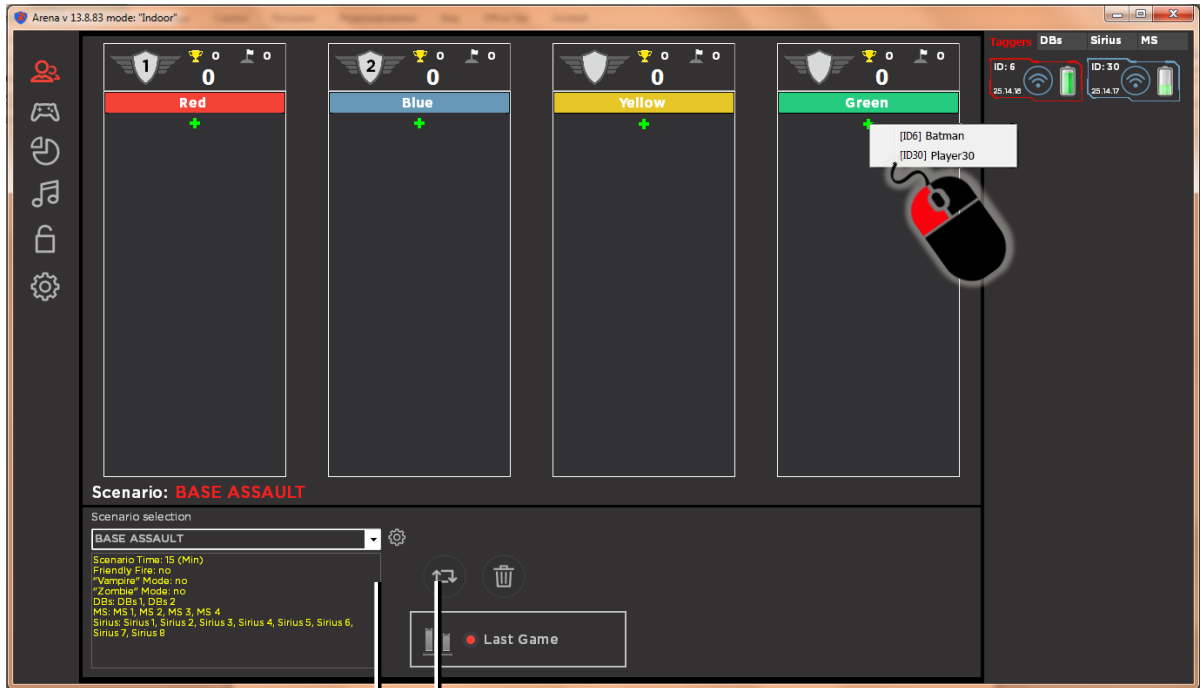
Assign players to teams randomly

Remove all players from teams

Distribution of players by teams with mouse clicks

Assigning or changing a player's nickname (name) is as follows: right-click on the kit ID in the team column, left-click on the inscription "Change player's name" and enter a new nickname in the window that appears. It must not exceed 20 characters, not contain the characters #,! and a tab. Press the button "OK".
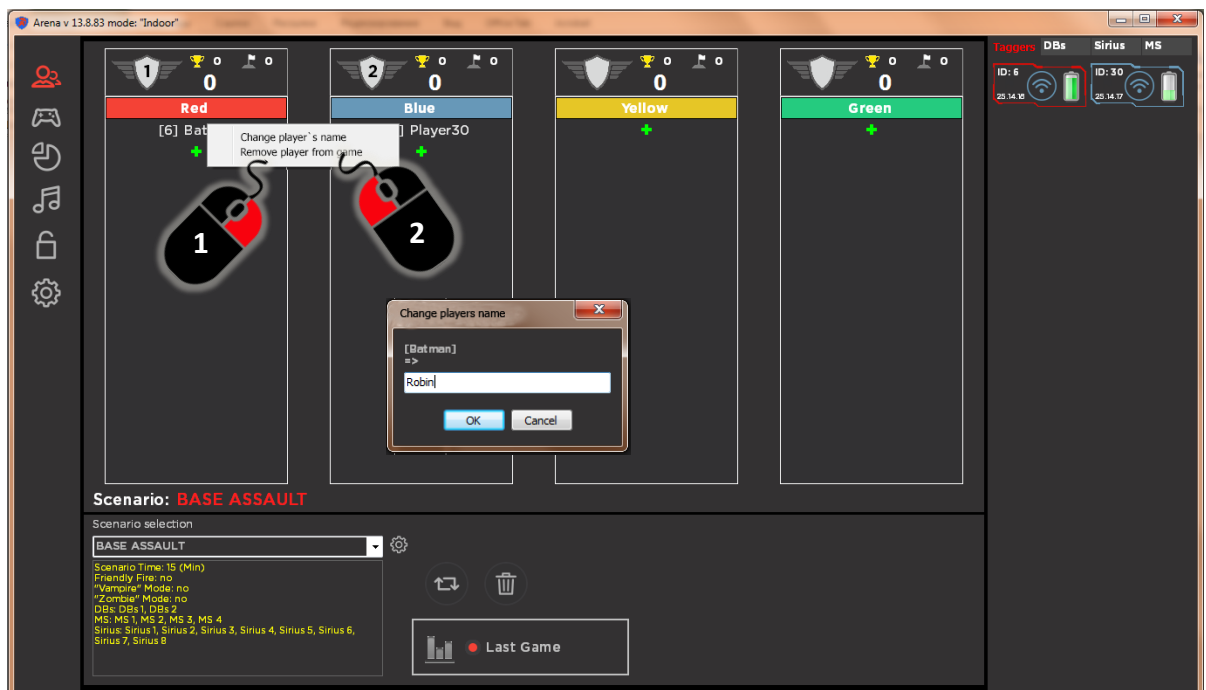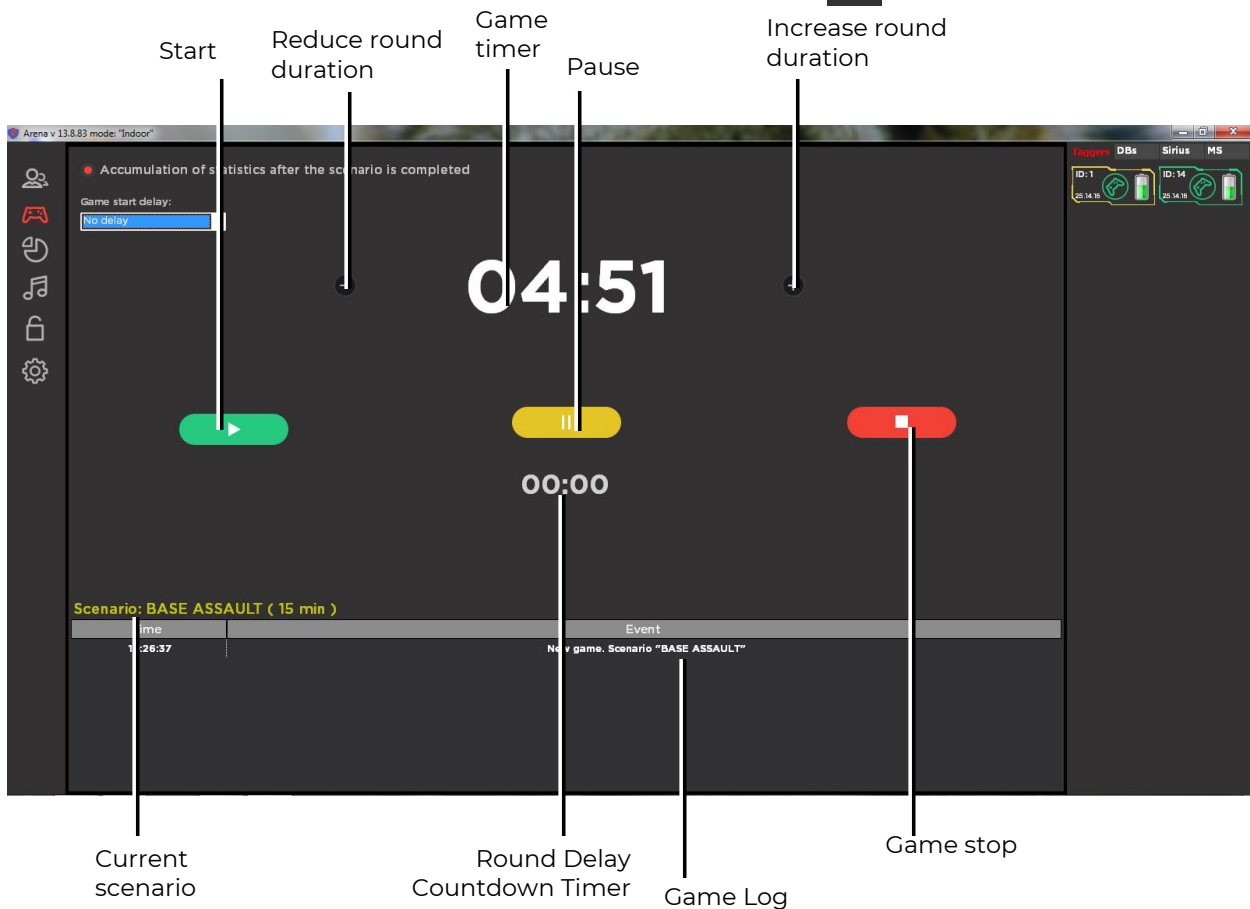

Assigning a new nick to a player

10.2.   Game control

After choosing a scenario, setting up game sets and additional devices, as well as forming teams, you can proceed directly to the game.

The window "Game Control" opens after clicking on the icon [game controller icon] .

"Game Control" program Mode

In the upper part of the window there is a radio button with which the accumulation of statistics at the end of the round is turned on. This is necessary if the game consists of several rounds and the teams are interested in the general statistics for the game.

There is an opportunity in program, to delay the automatic start. To do this, you need to select a numerical value (from 5 seconds to 3 minutes) from the drop-down list "Delay the start of the game".

In the center of the window "Game Control" there is the timer of the game round. After starting the game with the button [green play button] and the end of the delay time (if it was set), the game kits play the "Go-go-go!!!" sound command and the timer starts the countdown of the game round.
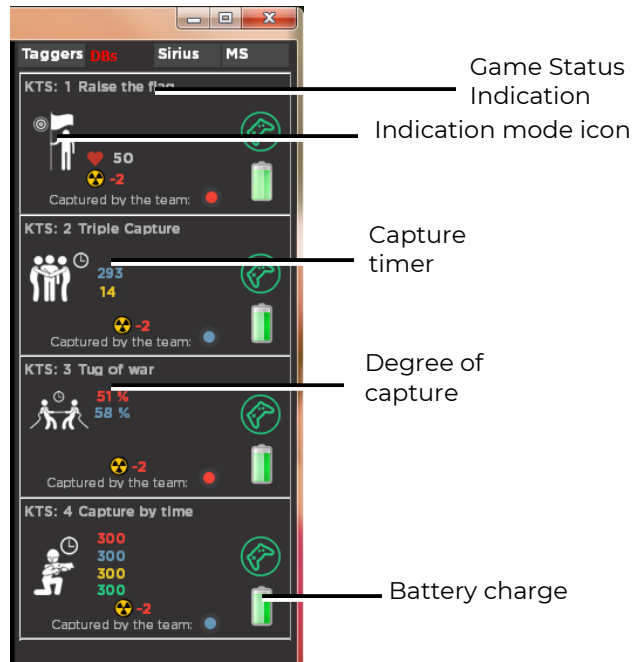
If necessary, you can quickly adjust the time: by clicking on the buttons [+] and [−] add or subtract by the minute relative to the time set in the settings (if the program is loaded with operator rights, this feature is not available).

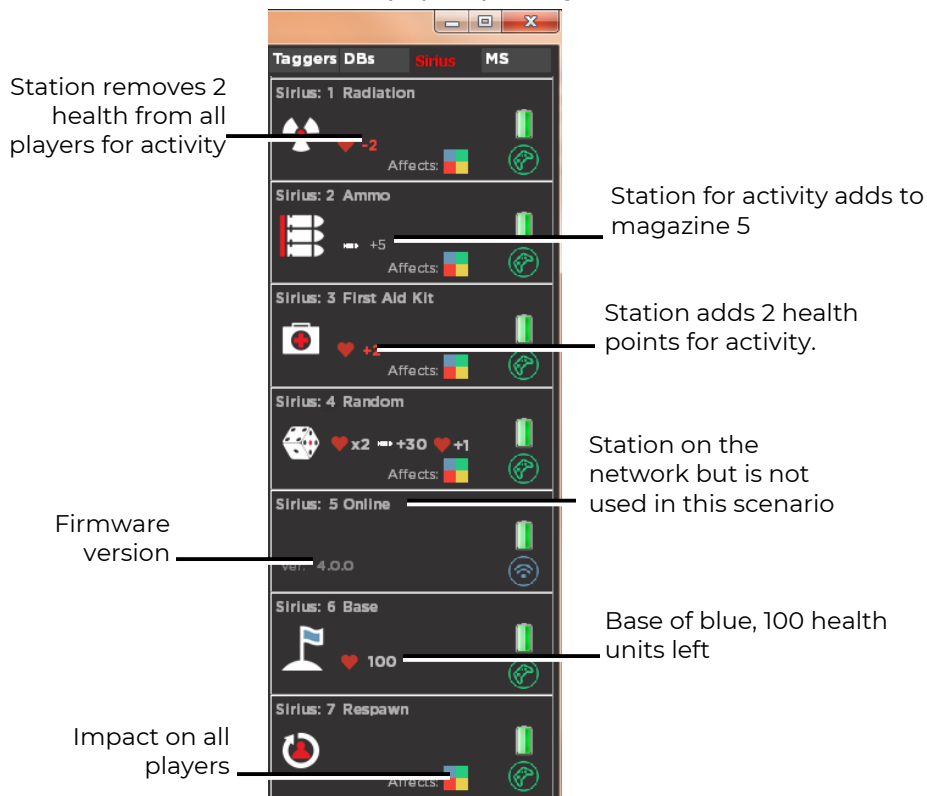The button [yellow pause button] pauses the game, and the button [red stop button] stops it.

The Gaming device status bar (right) informs about participation in the game and the mode of game kits and additional devices in the corresponding tabs ("Tagers", "DBs", "SIRIUS", "Multistation"). An image of the game joystick [joystick icon] appears in the cell of the game kit If the kit is removed during the game round, the icon will be discolored: [pause icon] When paused, the kit icon looks like this: [joystick icon] .
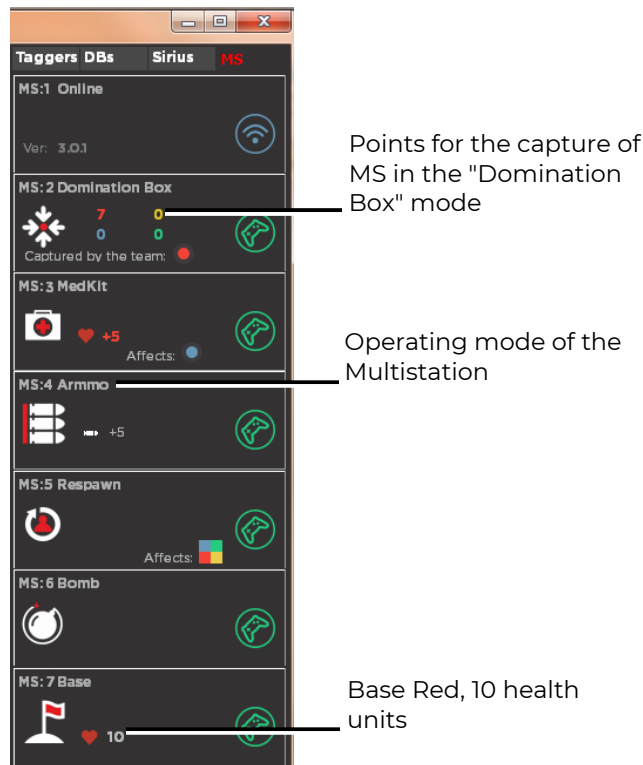
In the cells of additional devices, information is also displayed on the operating modes, the progress of capture, the remainder of the units of health, which commands are affected, etc.


Game Status Indication

Indication mode icon

Capture timer

Degree of capture

Battery charge

Display of operating modes of DBs

Station removes 2 health from all players for activity

Station for activity adds to magazine 5

Station adds 2 health points for activity.

Station on the network but is not used in this scenario

Firmware version

Base of blue, 100 health units left

Impact on all players

Display of operating modes of the SIRIUS Station

Points for the capture of MS in the "Domination Box" mode

Operating mode of the Multistation

Base Red, 10 health units

Display of Multistation operating modes

The Game Log located in the lower part of the central panel informs about everything that happens in the game (start of the game, disconnection of kits, DB capture, end of the game, etc.)

The program also allows you to send quick commands to each kit during the game: "Pause", "Unpause", "Add to game" (choose team color), "Remove from game", "Kill player in game", "Respawn the player in the game", "Leisure with radiation", "Apply Medkit", "Double lives". To do this, right-click on the icon of the selected kit and select the required quick command in the list that appears.
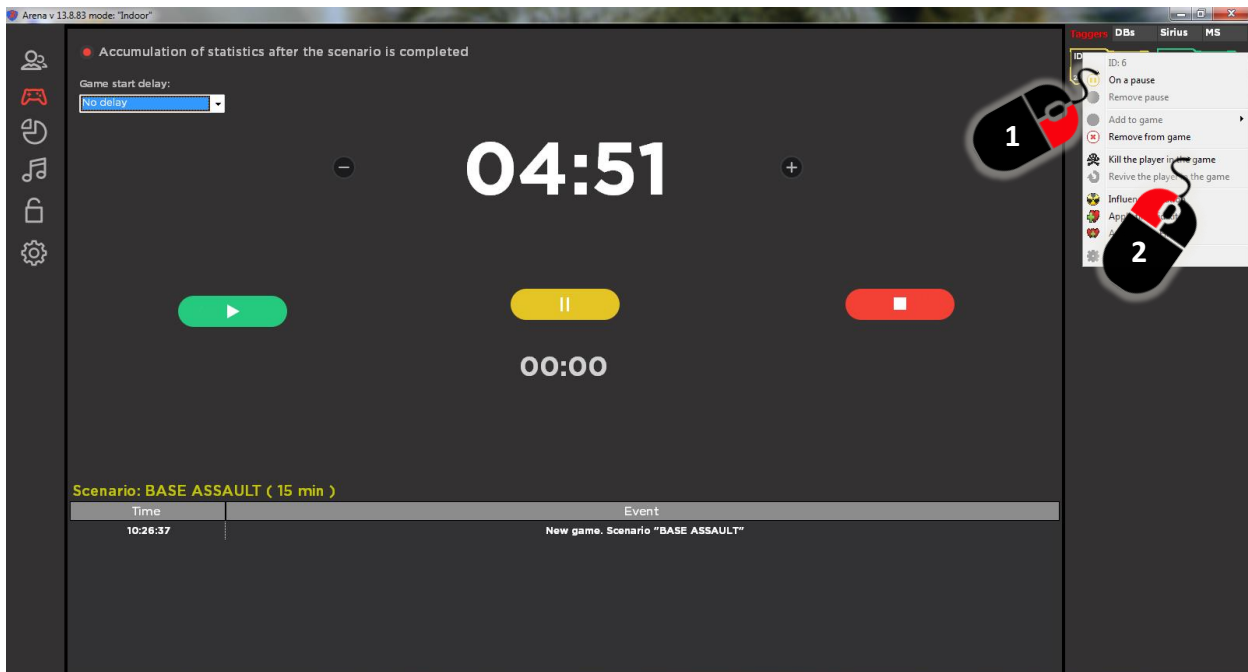
Sending a quick command to a kit

A round finishes automatically in two cases: when one of the conditions specified in the scenario is fulfilled (for example, one team remains, the opponent team's base is captured, the specified number of points is scored) or when the game timer has triggered.

10.2.1. The algorithm for determining the winner in the game

- First of all, the winning team is determined by the fulfillment of the condition or one of the conditions for the completion of the scenario, if any are specified in the current settings (see chap.10.1.1.) In this case, the round ends ahead of schedule.
- If the round ended at the end of the scenario time or after the administrator stopped the game early, and the game did not use Smart Domination Boxes (DBs) and/or Multistation (MS) in the domination box mode, the winner is determined based on the sum of team points accumulated.
- In the case when DBs and/or MS are used in the scenario, after the game is stopped, team points are considered last - if the conditions for completing the scenario are not met or if other indicators are equal.
- When using the Smart Domination Box in the game after stopping the game, the winner is determined depending on the number of captures of each team.
- If several DBs are involved in the game, the team with the most capture at all points wins. In case of equality of these indicators or the absence of captures, team points are taken into account.
- Since when using the Multistation scenario in the Domination Box mode, points are awarded in proportion to the retention time, the winner is also awarded according to the points accumulated. When several Multistations are involved in the game, a leader is determined on each device, and the overall result is determined by the number of first places.
- With the simultaneous use of DBs and MS (in DB mode) when a game is stopped, the sum of the game is determined by comparing the results of each of the teams by the number of captures of Domination Boxes and the points accumulated for holding MS. The team which has more victories, wins.

10.3.   Game statistics

The window "Game statistics" is opened by clicking on the button , and allows you to view the statistics of players during the game and after it finishes. There are two tabs "Current game" and "All games" in the window. The second tab will differ from the first in content if the option "Accumulate statistics after the end of the scenario" is enabled in the "Game Control" window.

Each of the tabs has two sub-tabs: "Players statistics" and "Summary statistics". The tab "Player statistics" allows you to control during the game and get statistics after it according to the following parameters: damage dealt and received, number of shots and hits made, accuracy (ratio of number of shots to number of hits), number of defeats, DBs captures, hits in SIRIUS and Base, the number of points scored and the number of frags.
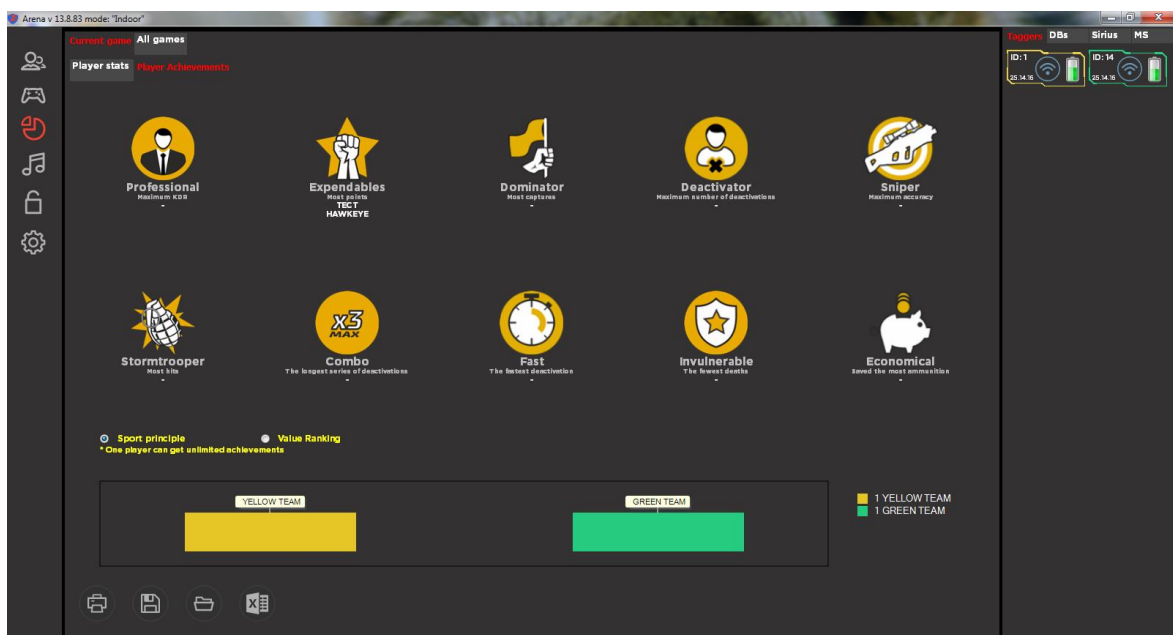
Print

Save statistics   Download Statistics

Export To Excel

"Player Statistics" tab when selecting "Curent Game"

The tab "Summary statistics" is divided into three parts: the nominations field, the schedule of team points and the team points table for capturing the Domination Box.

Icons, names and meaning of 10 comic nominations that players receive after the end of the round are displayed in the field of nominations. The nomination algorithm is designed so that the maximum number of players is covered. Ranks are assigned based on the final table of indicators. There are two options for the distribution of nominations: the sports principle, this is when one player can get an unlimited number of nominations, and ranking by value. In this case, the player who received the highest-rated nomination (counting from left to right in the window) no longer takes part in the distribution, even if he is suitable for other nominations in terms of indicators.


The tab "Summary statistics" when choosing "Current game"

Player statistics can be printed on a printer connected to the computer (button 💾), saved (button ⬜ .sts extension for statistics of the current game or .allsts for statistics of all games), downloaded previously saved (button 📂), or exported to Excel or OpenOffice (button 📗).
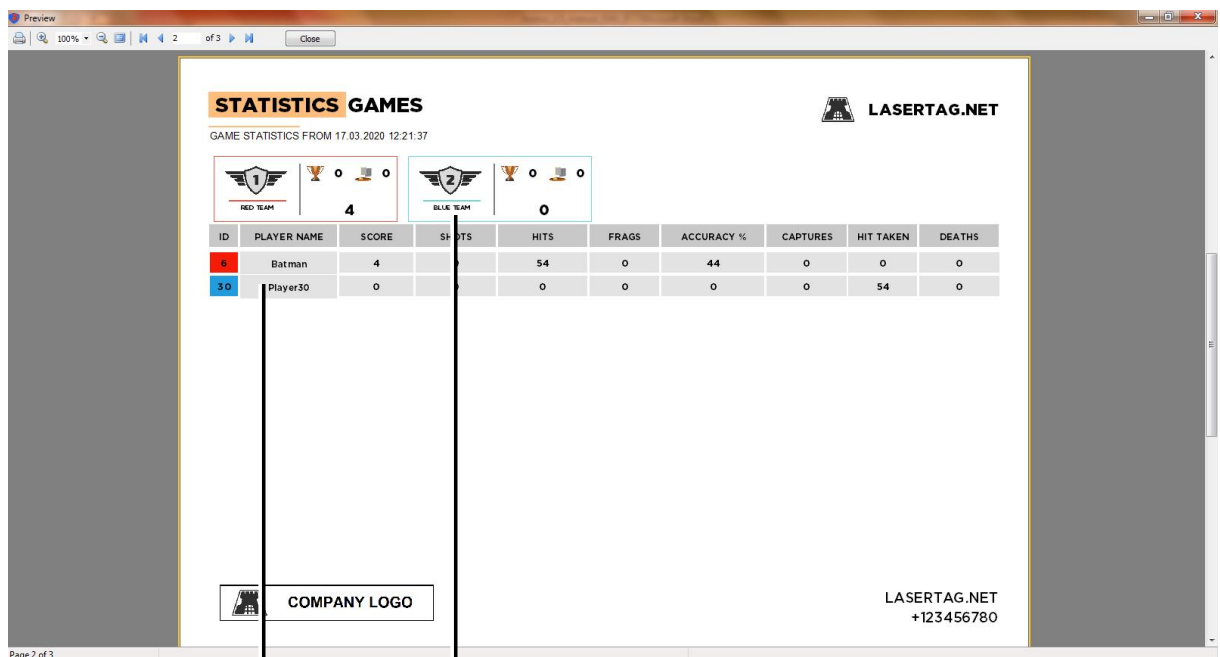
When you click on the print button 🖨 , a preview window opens for the pages that will be printed. You can change the club attributes displayed on the form in the "Main program settings" window (Chapter 10.6.3).

Zoom   Zoom Out   Next Page
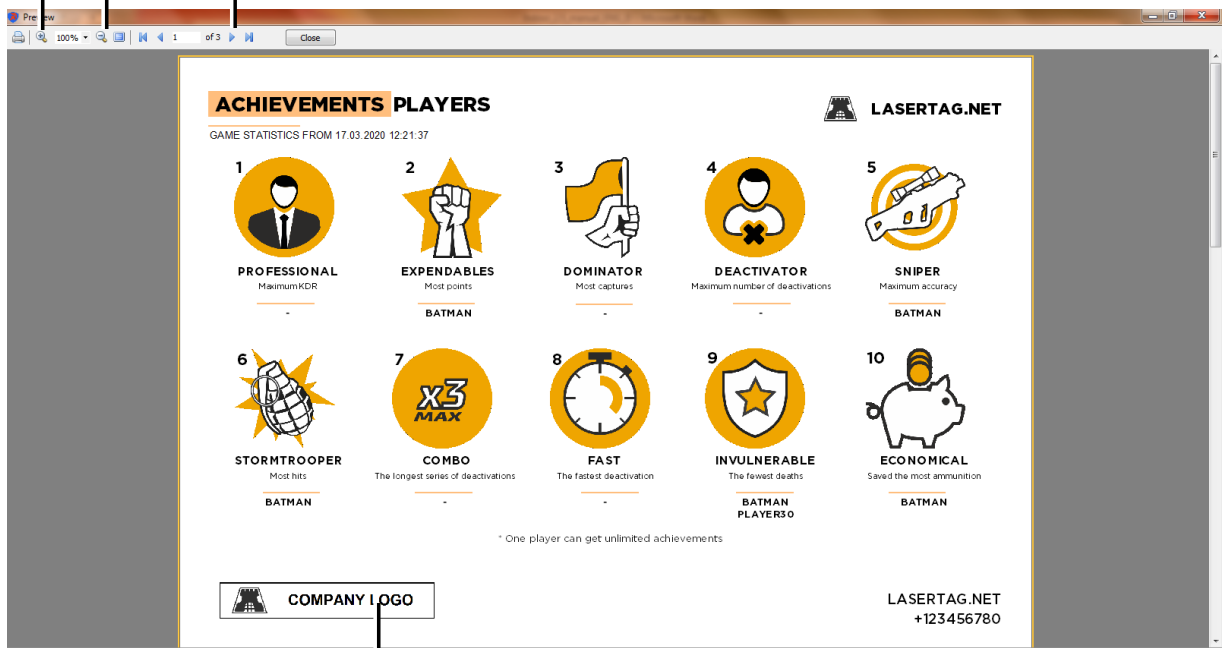
Club Attributes

Preview "Player Achievements" Page

Individual Statistics   Team Statistics

Preview of the "Game Statistics" Page

45

In addition to the report on the achievements of the players and the general statistics of the game, it is possible to print cross-statistics, which indicate how many times the players hit each of the opponents.

In the print settings window you can select the printer, the pages to be printed, and the number of copies.

10.4.   Sound and music settings

The window is opened by pressing the button ♫♫ .

Sound accompaniment, alongside with light design, is an indispensable attribute of Arena laser tag games. ARENA software ensures creating a corresponding atmosphere in the game premise by means of sound effect and music tracks. The sound is produced on the PC and/or through audio output on the sound systems.

You can create a playlist of 10 compositions of background music in the pauses between games, as well as a playlist of 5 songs to play during the game.

The list is played "in a circle", i.e. after the last melody, the first plays.

In the same way, voice messages about events occurring on the playing field are downloaded: "Start of the game", "Domination Box captured by the red team", etc.

Current background music playlist
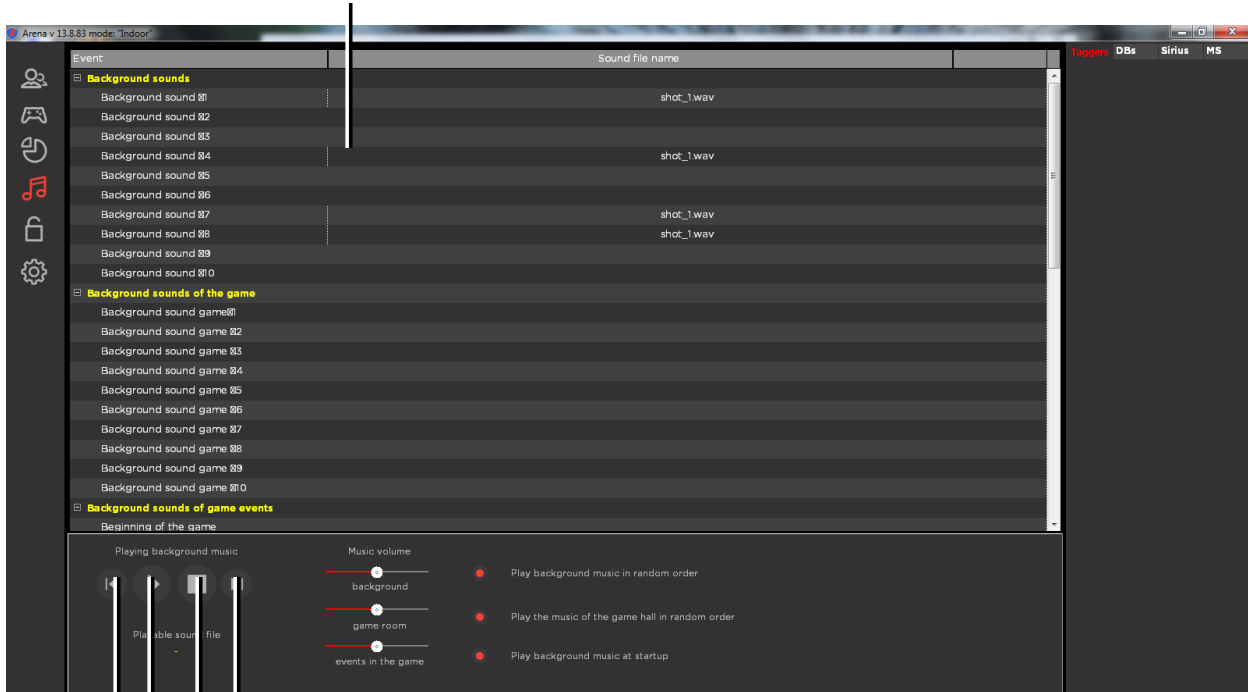
Previous file

Next file

Stop

Play the file

Music and Sound Settings Window

Listening to the sound file is performed using the standard buttons for the media player: ▶ - play, ■ - stop, ◀ - play the previous file, ▶| - play the next file.

It is also possible to set a parameter making background music to start playing when program launches marking the corresponding item in the panel.

Volume of reproduced background music in pauses, game music and game messages is adjusted by means of scroll boxes: to the right – louder, to the left – quieter.

46

10.5.   Fiscal statistics

The "Fiscal statistics" window appears after clicking on the icon and is available only for the Owner of the enterprise conducting the game.

At the first launch of the program, the Owner must set login passwords for different statuses: Owner, Administrator or Operator (see chapter 10.6.4 of this manual). For each of them, there are different access rights to the scenario editor, kit settings, fiscal statistics, etc.

The next time you enter the program with the Owner's rights and enter the password correctly, the "Fiscal statistics" window opens, which displays the date, start and end time of the game, the set and actual time of the round, the name of scenario and the number of game kits that participated in the game.

Clear Statistics
Export to Excel or OpenOffice
Upload statistics to the server

Fiscal statistics window

If necessary, you can clear the statistics or export the table to Excel or OpenOffice (depending on the program installed on the computer).

In the program version starting from 13.8 (with firmware from 19.2) fiscal statistics can be uploaded to the server.

You can get instructions on working with the fiscal statistics server by contacting the company's technical support service.

10.6.   System Configuration

Pressing the most bottom icon places program into a window "System configuration".

System messages
log
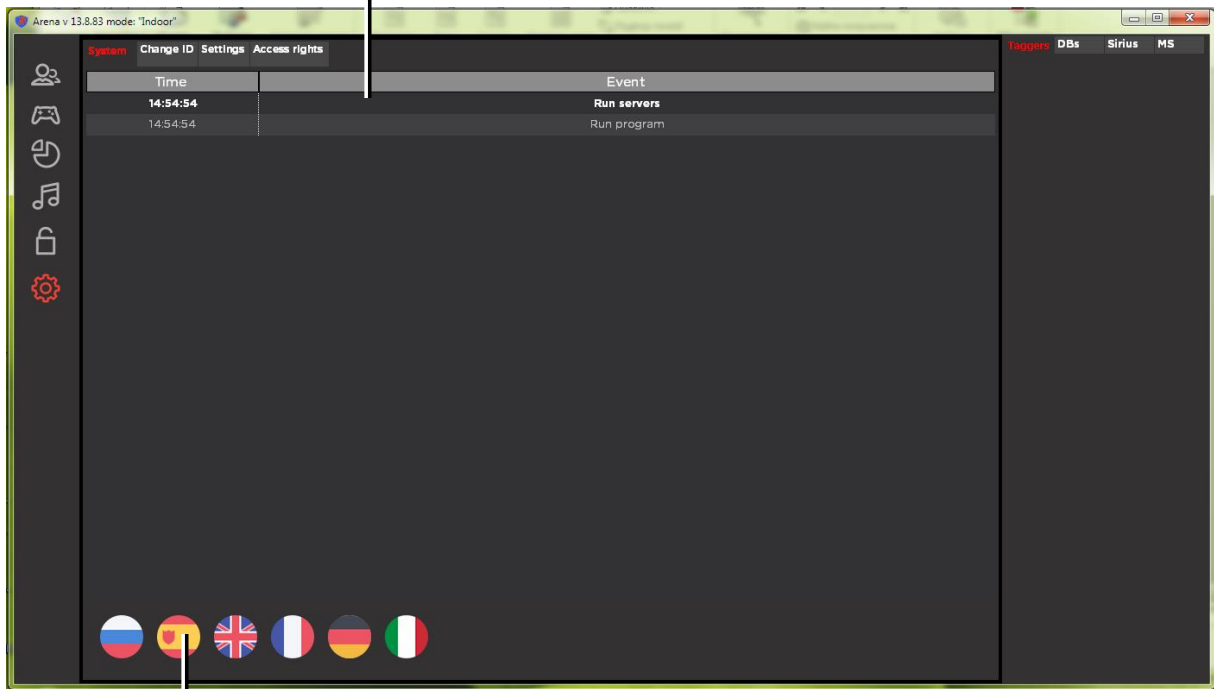
Set interface
language

"System configuration" window

The window contains four tabs: "System", "Change ID", "Settings" and "Access rights".

10.6.1. System

Information on all system events with reference to real time is displayed in the " System" tab: "Launch of the program", "Launch of the server", "Kit ID1 is disabled", "DB scan capture", etc.

In the tab, you can select the program language. Currently available are Russian, Spanish, English, French, German and Italian. The selection is made by pressing the button with the corresponding flag.

10.6.2. Change ID

In the tab "Change ID" you can change the identification number (ID) of not only the game kits, but also of additional equipment (the same ID that is installed on two or more kits leads to device malfunctions):

The order is as follows:

- Enable in standby mode (i.e. in normal) only the kit/device in which you want to change the ID.
- Wait until the kit/device contacts the server and the corresponding cell of the status panel of the gaming devices becomes active – the icon will take the form   : (tab "Tagers", "DBs", "SIRIUS" or "MS").
- In the corresponding field "Change ID", select the actual ID of the connected kit/device from the drop-down list.

48

- From the drop-down list, select the number to which the ID should be changed.
- Press the button ⟳ .

Turn the kit/device off and on again in normal mode.

"Change"
Button

Select device
number

Putting the device
into boot mode
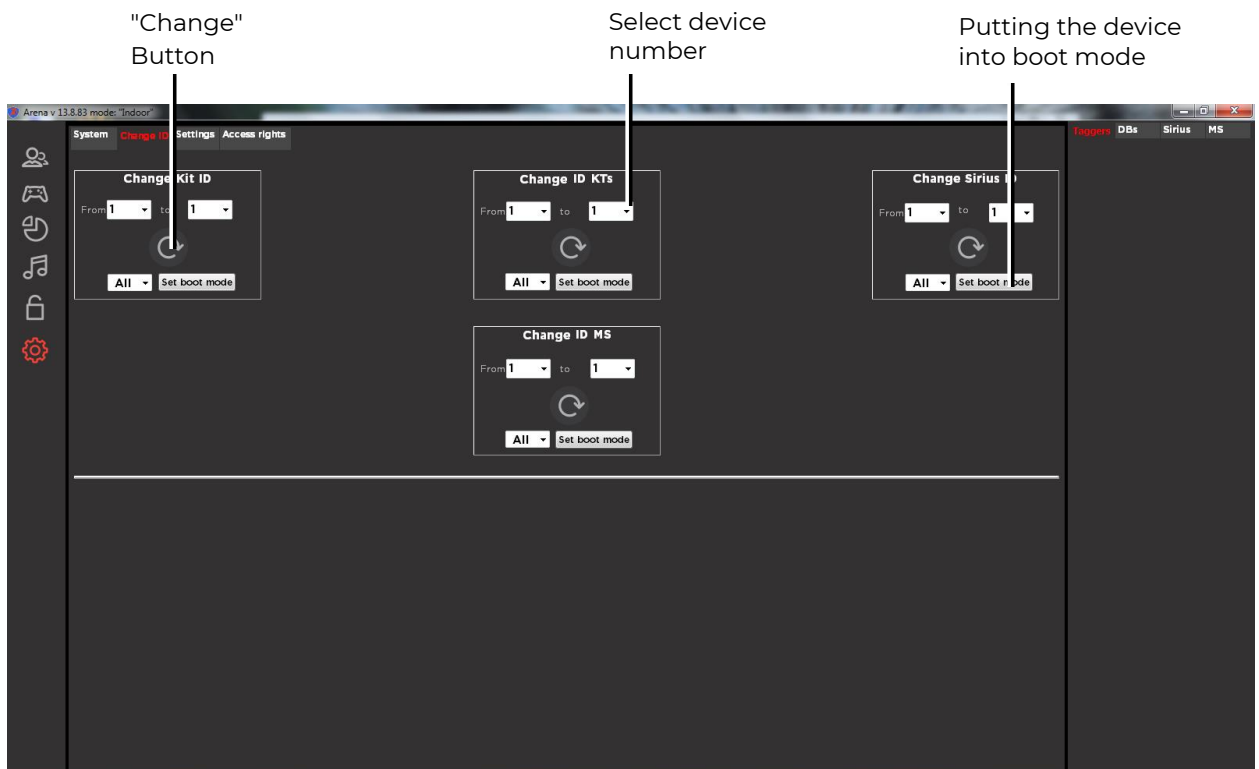
ID Change Tab

- In the tab you can also remotely transfer additional devices to boot mode. This is necessary to update the firmware of the microcontrollers of the equipment. A description of the translation procedure is given in chapter 11.

For game kits, it is also possible to change the ID manually:

- Turn on the kit in service mode - with the blaster trigger pressed (in the firmware older than version 25.13.8 - with the blaster functional button held down).
- At the same time, hold the trigger and reload button for about 8-9 seconds.
- After the sound signal, release the trigger and button - the kit ID will be reset to the 1st number.
- Briefly pressing the reload button, set the desired number. Changing the number will be accompanied by a sound signal.
- Turn off the kit and turn on as usual

10.6.3. Settings

The "Settings" tab is divided into two parts: the upper one allows you to configure the TV Out server and the displayed information on an external screen, the lower one - the form of printed statistics.

The setup of the TV Out server is given in Chapter 12.

In the field "Setting the form of printed statistics" you can create an individual form, which is printed at the end of the games. The following fields are available for editing: name, phone, website, club or company address.

To replace the upper logo, you must upload (by clicking on the "Browse" button) a .png image of 45x45 pixels in size, for the lower logo - 680x120. When loading a larger image, the

image will automatically fit to one of the sides of the specified rectangle. It is not recommended to load a smaller logo, because the picture is stretched and the image will be of poor quality.
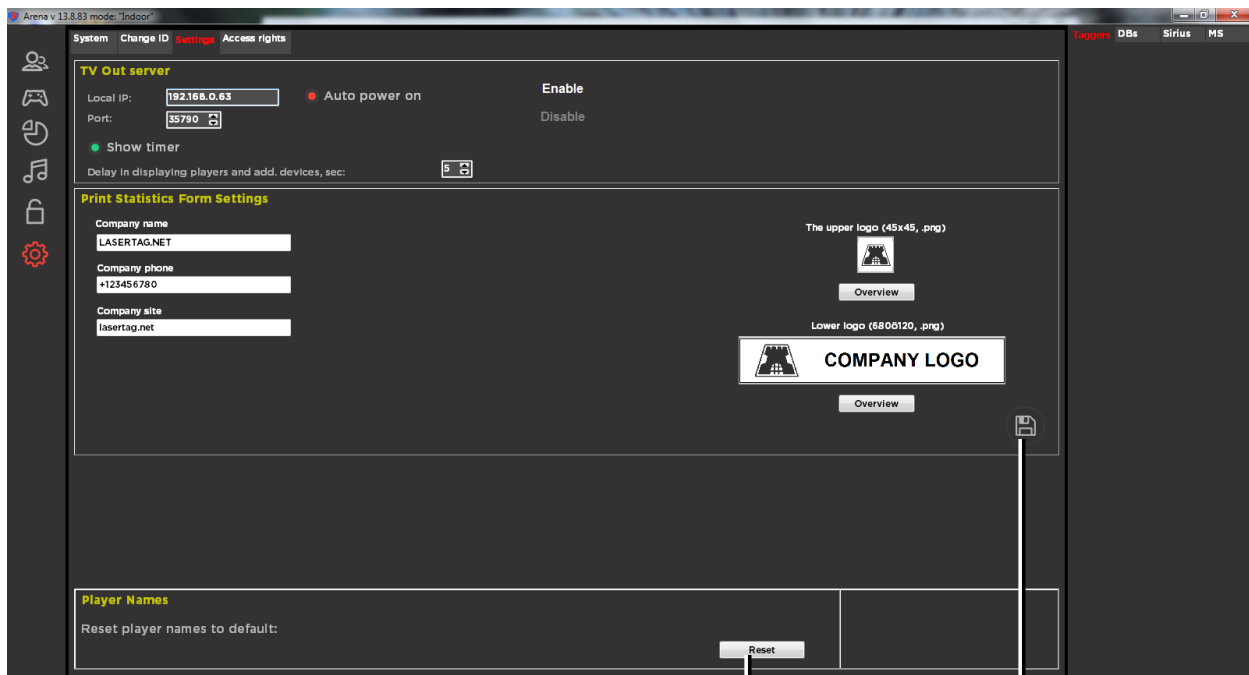
Reset names to standard   "Save Changes" Button

"Settings" tab

Top Logo   Company Name

Lower Logo

Company website and phone

Editable company attributes on the statistics form

To save your changes, click the "Save" button 🖫 .

In the "Reset names to standard" field, the corresponding names return the default names to the kits.

10.6.4. Access permissions

In the program you can differentiate access rights to settings and fiscal statistics to various groups of game club employees.

When you first start the program, you have access to all the tabs. The owner should check the box "Delineate access rights in the program" and set login passwords for different statuses. Click the "Save" button 💾 .

"Save Changes" Button
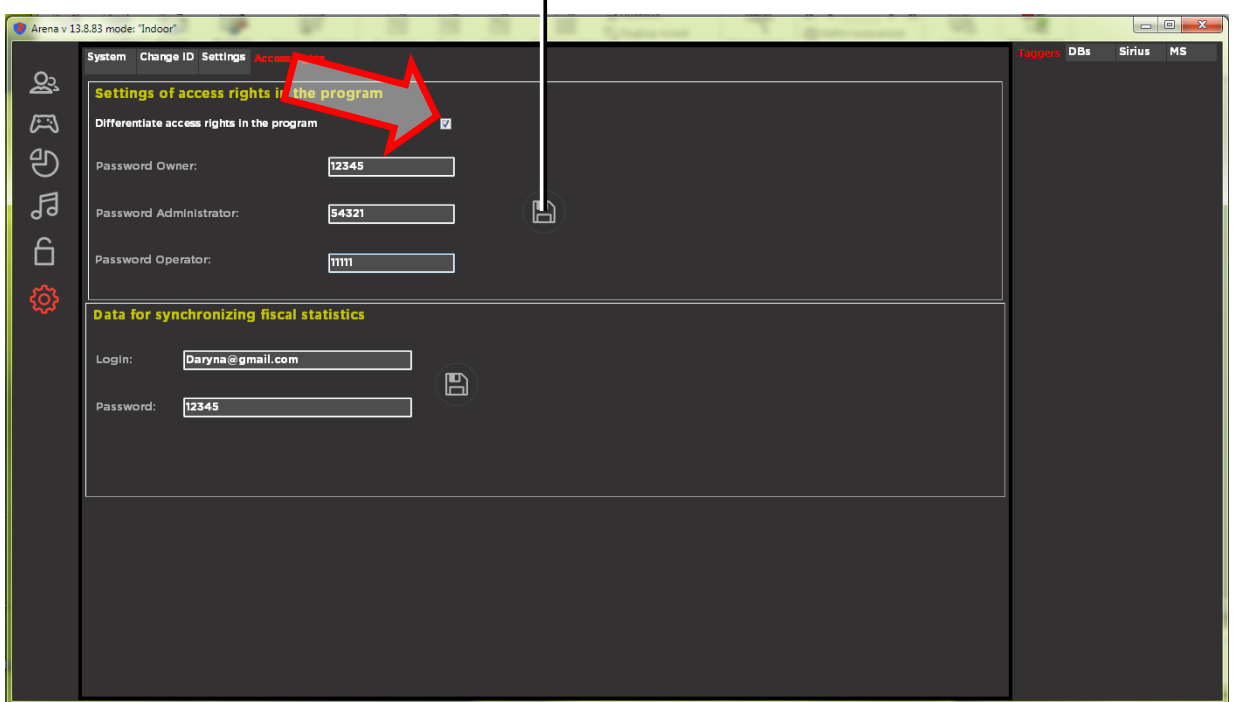
Setting passwords for entering the program

The next time user opens the program, he is prompted to choose under which status he will work, and enter the appropriate password.
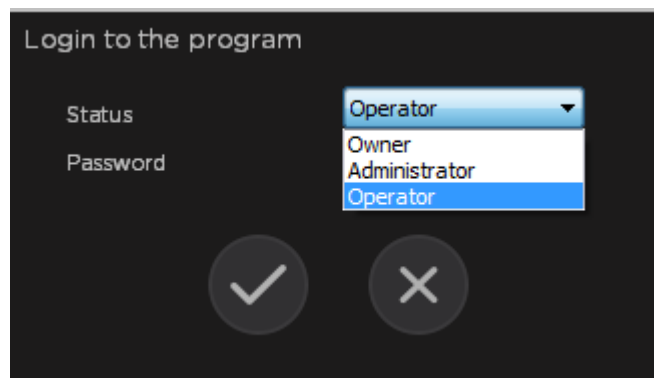
Status Password Entry Window

To confirm the entry, click the "Apply" button ✔ .

For a program loaded with the "Operator" rights:

- There is no access to change the round time.
- There is no way to select and edit scenarios (only the one selected by the Owner or Administrator is displayed).
- There is no way to change the settings of kits and additional devices, both from the scenario editor and through quick access.

- There is no access to fiscal statistics.
- There is no access to the "Settings" and "Permissions" tabs.

With the rights of "Administrator":
- There is no access to fiscal statistics.
- There is no access to the "Permissions" tab.

All tabs and settings are available for the Owner, including the "Permissions" tab. On this tab, you can enable or disable the function of delimiting access rights in the program, as well as set or change passwords for the Owner, Administrator and Operator.

11. Firmware update for gaming microcontrollers

The need to update the firmware of microcontrollers for gaming devices for laser tag arena arises because of the continuous improvement of the software, both in terms of adding new features, and in terms of correcting detected bugs.

🛈 **To determine the possibility of installing new firmware on existing kits and additional equipment, it is recommended that you consult with the company's technical support staff. Otherwise, there is a great risk of equipment becoming unusable.**

Technical support also sends by e-mail firmware files that have the extension .lzt, which must be saved in any directory on the computer.

The firmware is done remotely via a wi-fi channel.

For flashing microcontrollers of game kits and additional devices, the BootLoader program is used, the current version of which can be downloaded at: https://lasertag.net/support/ (Section "Indoor"/ Software for Windows/ BootLoader to update the firmware). You must click on the "Download" button - the program archive will be downloaded to the default folder. From there, it must be unzipped to any computer directory.

Like the ARENA program, the BootLoader program does not require the installation procedure on the computer's hard drive to run - just run the BootLoader.exe executable file.

You must also run the ARENA program.

You must make sure that the kits and devices are correctly connected to the server and displayed in the ARENA program. If this does not happen, check that the PC on which the program is running is on the same network where the equipment is connected by default.

11.1. Updating game kits firmware

Before updating the firmware of game sets (blaster + vest), it is recommended to check the current versions. To do this, turn on the kit in <u>service mode</u> - with the trigger held down. The blaster screen will take the following form:
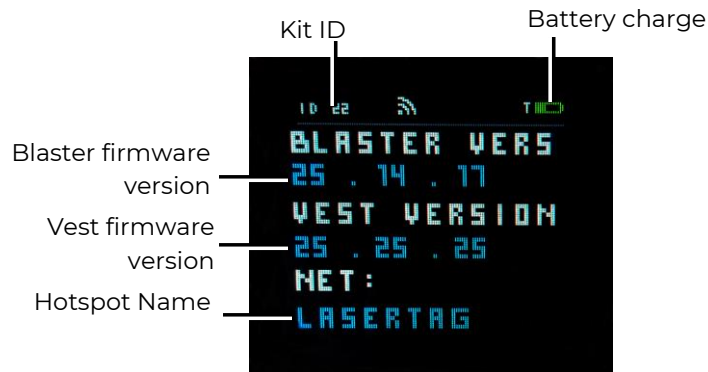
Check firmware version. If it differs from the installed one, or there is a need to update the current one, continue the procedure.

Firmware can be updated by several kits at the same time, but it is recommended to carry out the procedure with no more than 10th.

To update the firmware of game kits, you need to enable them in <u>bootmode</u>. The mode is activated by pressing the power button of the control unit of the vest while simultaneously holding the reload button and the blaster trigger.

You can also put the bootmode from the program. For that, you need to:

- Turn on kits whose microcontroller firmware will be flashed.
- Wait for their connection to the server and the appearance of kit tiles in the right panel of the program.
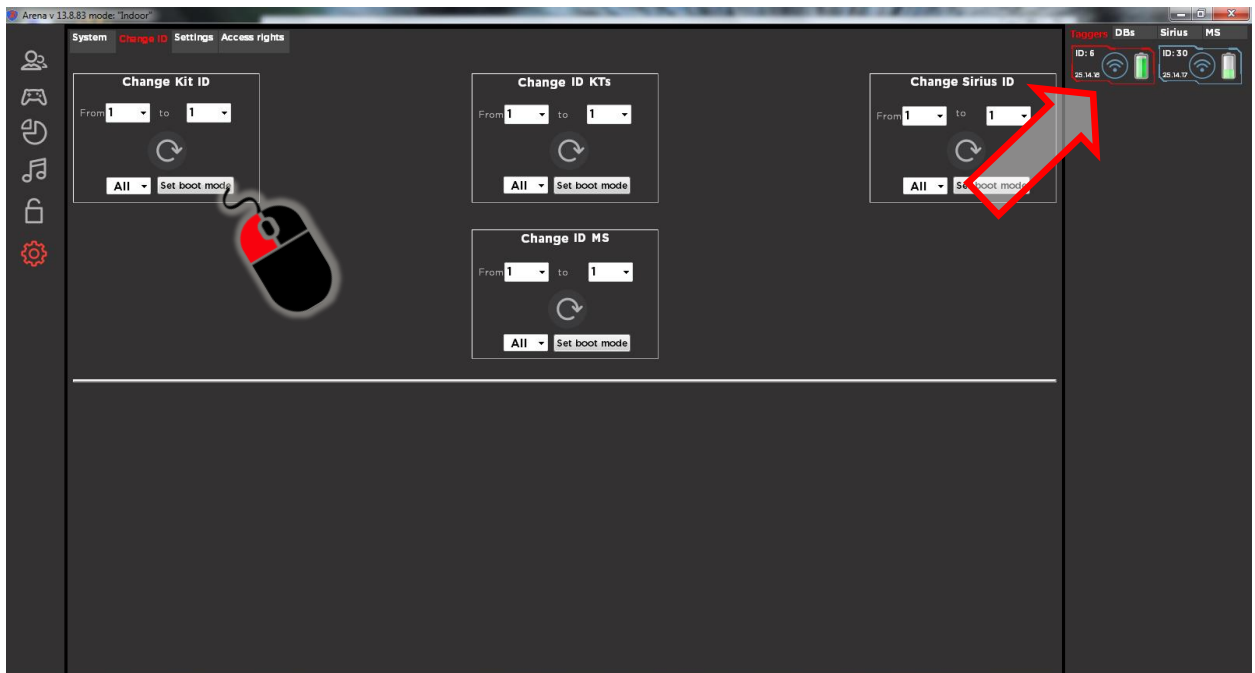
Putting kits into bootmode

- In the "Change kit ID" field, select either "All" (if all kits are switched to this mode), or the required number from the drop-down list.

- Press the "Set boot mode" button.

The inscription "Boot" is displayed on the laser tag gun screen and the numbers that will further show the percentage of firmware download.

Hotspot Connection Indication

Firmware progress indication
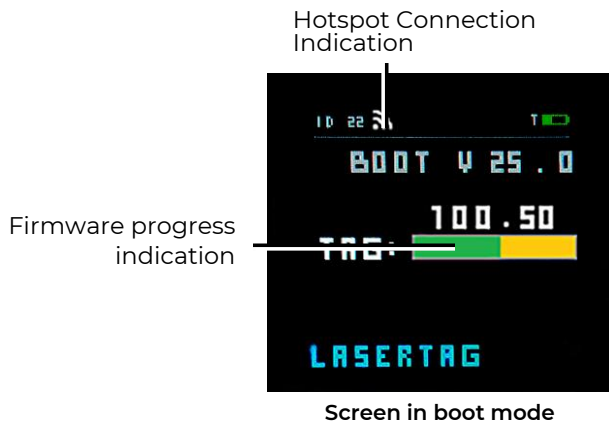
Screen in boot mode

At the same time, the numbers of the kits included in the boot mode and the presence of the firmware to be flashed should be displayed on the screen of the BootLoader program.

"Start/Stop" button

Delete firmware file

Indicator of the firmware download process
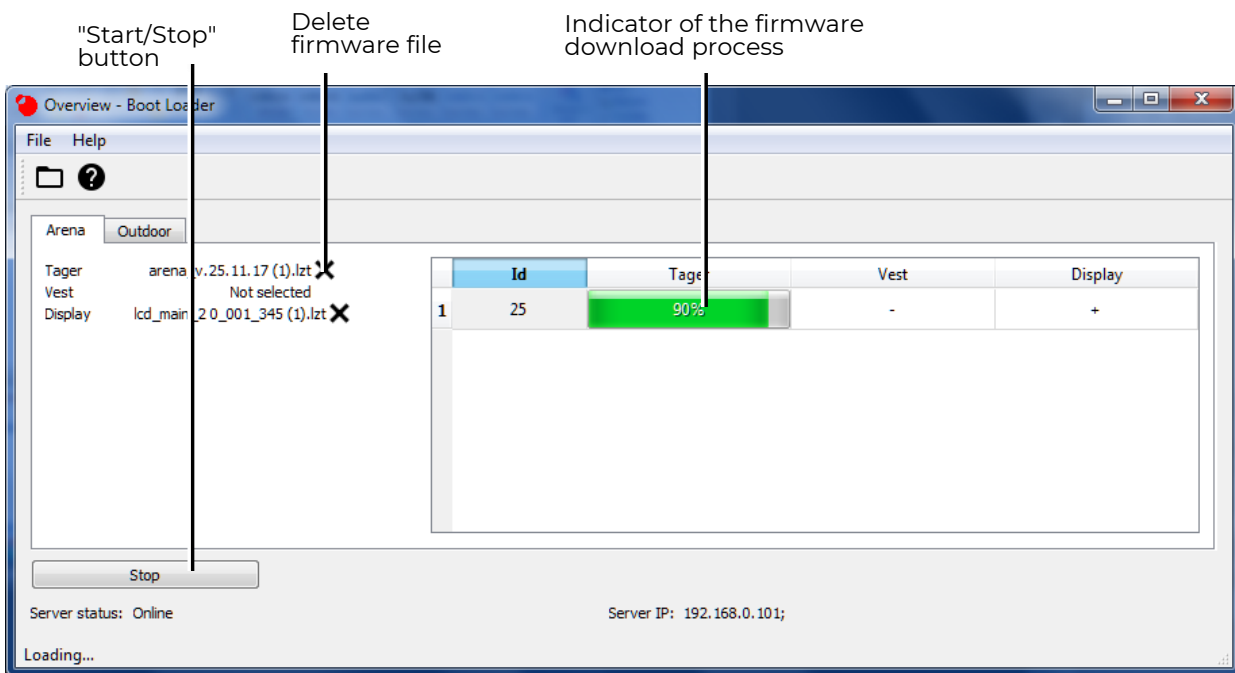
Microcontroller firmware for game kits

The procedure for updating the firmware of microcontroller kits is as follows:

- Using the File/Open dialog (or by pressing Ctrl + O), select the firmware files from the computer's hard drive. For blaster and vest controllers, combined firmware ARENA_v.X.lzt (where X is the firmware version), for the screen - lcd_main_X.lzt. Holding the Shift button, you can select both files at once. Click the "Open" button.
- The program automatically determines what type of device and component the selected firmware belongs to. To deselect a file - click the cross next to its name. If the file does not determine the device's ownership or the file is damaged, an error message will be displayed.
- With the correct choice of firmware, the "Start" button becomes active, by clicking on which the process of flashing microcontrollers begins. Progress bars at the

same time show the percentage of completion of the firmware process. The process can be stopped by clicking on the "Stop" button. In parallel, you can observe the progress of the firmware on the blaster screen - the first three digits after the name of the firmware indicate the percentage of update completion.

- After the end of the firmware, the kits automatically reboot in standby mode and, when the procedure is completed correctly, and when connected to the server, are displayed again in the ARENA program.

If some kits fail during firmware, the procedure should be repeated.

11.2. Smart Domination Box Firmware Update

You can also transfer the <u>Domination Box</u> to boot mode manually (turn on the device with the system button held down) and remotely from the ARENA program. The procedure for transferring the device to boot mode from the program is similar to the transfer of kits.

If it is necessary to update the firmware at several Domination Boxes, it is recommended to carry out this procedure sequentially separately on each of the devices.

The procedure for updating the firmware is as follows:

- After consulting with the company's technical support staff, download the necessary files for the firmware from the https://lasertag.net/support/ in the section "Support/ Firmware for DB SMART" (4 files)
- Launch ARENA and BootLoader programs.
- Turn on the Domination Box for which you need to update the firmware.
- Wait for its connection with the server and the appearance of information about it in the ARENA program. In this case, the four middle LEDs on each of the indicator columns of the device begin to periodically light up in different colors.
- Check firmware version. If it differs from the installed one, or there is a need to update the current one, continue the procedure.

Current firmware version — KTS: 2 Online / Ver: 2.3.7
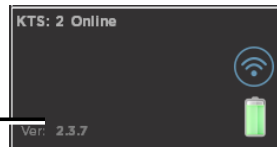
- In the ARENA program, on the "Change ID" tab of the "System Settings" window, select the number of reprogrammable DBs from the drop-down list
- Press the "Set boot mode" button.
- Successful transfer of this device to boot mode will result in disconnecting it from the ARENA program. At the Domination Box itself, all the LEDs of the indicator columns go out, only the green power indicator lights up.
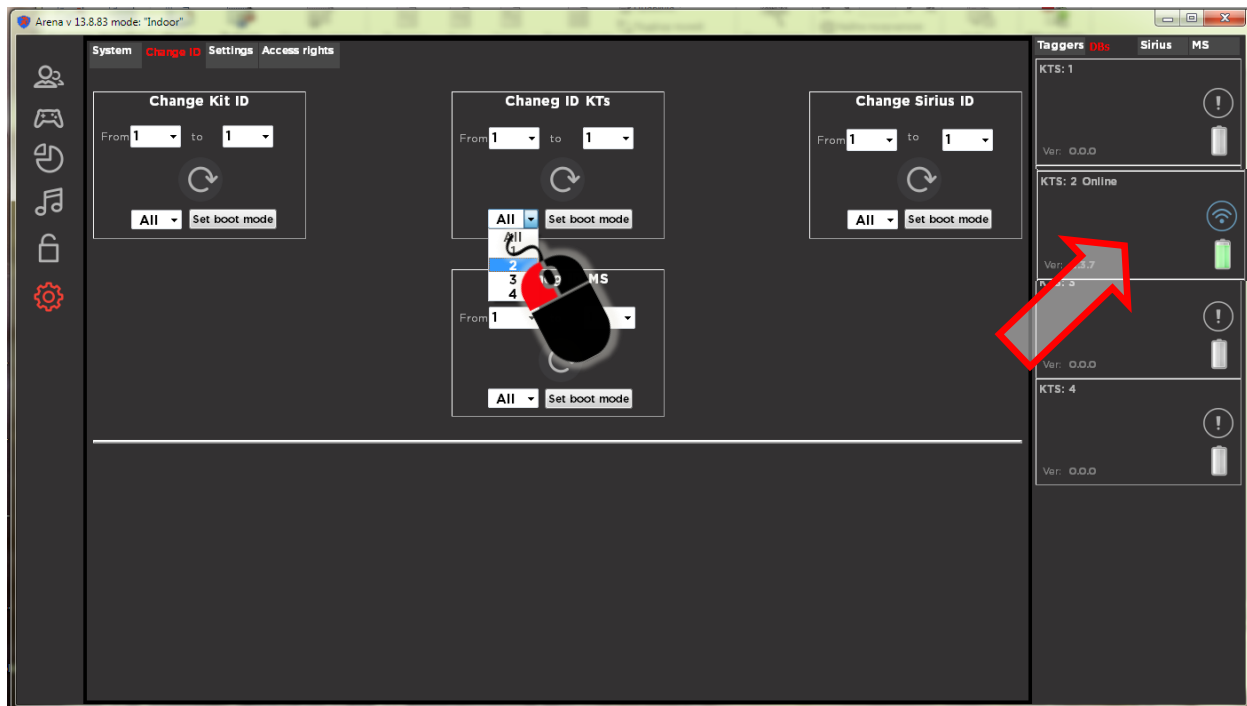
Choosing a Smart Domination Box number to put into boot mode

Next, open the BootLoader program. The "Control point (smart)" tab should appear in the program, you must go to this tab. The number of the Domination Box should be visible on the right panel. Now you can go directly to the firmware update:

- Using the File/Open command (or using the Ctrl + O key combination), select the KTS_flash_loader_part_1.lzt file previously downloaded to the computer's hard disk. Click the "Open" button. If the file does not determine the device's ownership or the file is damaged, an error message will be displayed. In this case, deselect the file - click the cross next to its name.

- If the file is selected correctly, the "Start" button becomes active by clicking on which the process of recording a sound file begins. The progress bar at the same time shows the percentage of firmware completion. The green LED - the power indicator of the device blinks at a high frequency.

- After the first part of the sound file has been recorded, on one of the indicator posts the lower LED lights up in green. After a while (from 30 seconds to 2 minutes), the LED flashes 3 times, which indicates a reboot of the DBs.

- On the right panel of the BootLoader screen, a line appears with the device ID and the "+" sign in place of the progress bar.

- Click on the "Stop" button.

- Similarly record audio files to the device KTS_flash_loader_part_2.lzt и KTS_flash_loader_part_3.lzt.

- At the last stage, it is necessary to flash the file of the main control firmware of the Domination Box - KTS_vX.X.X.lzt (where X.X.X is the version number of the firmware). The process is similar to recording audio files. The only difference is that at the end of the firmware, the Domination Box automatically goes into standby mode. If the ARENA program is running, DB connects to the server (the four middle LEDs on the racks begin to periodically change the color of the glow), information about the Domination Box reappears in the status panel of the game devices.

- If a failure occurs during the firmware update, the procedure should be repeated.

- If during the firmware the "Stop" button is pressed, the Domination Box will remain unflashed and the procedure should also be repeated.
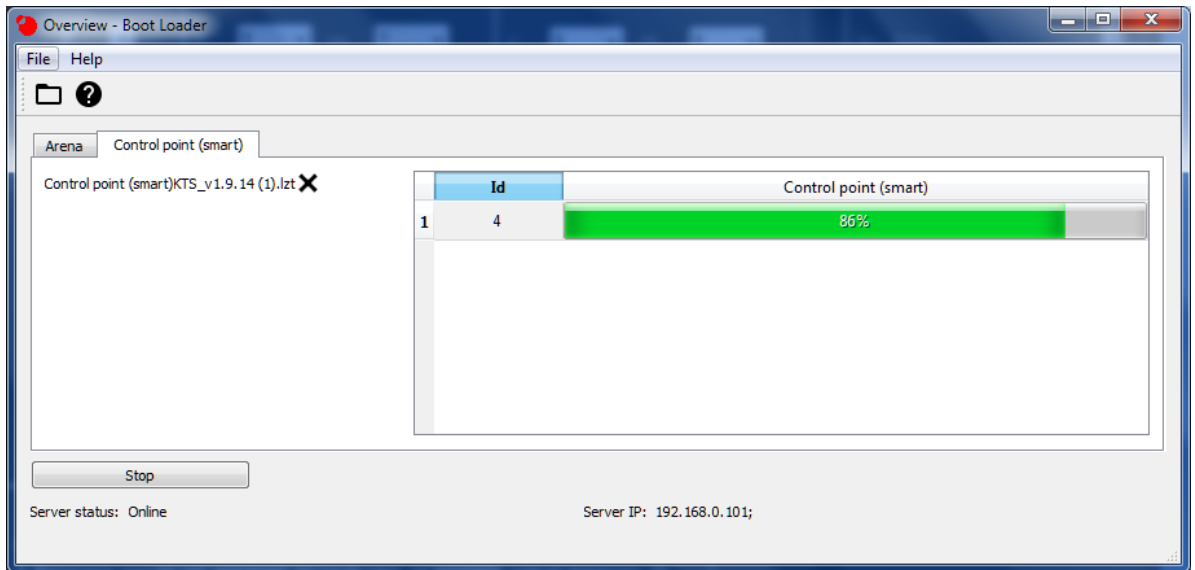
Firmware DB microcontrollers

11.3. SIRIUS Station firmware update

The firmware of the microcontroller of the SIRIUS Station has its own peculiarities - the device does not have a system button and you can only put it into <u>boot mode</u> from the ARENA program.

The sequence is as follows:

- Launch ARENA and BootLoader programs.
- Turn on SIRIUS Stations for which firmware updates are required (up to 8 devices can be flashed simultaneously).
- Wait for their connection with the server (the LEDs on the display panel light up and fade alternately in different colors) and the information about this appears in the ARENA program.
- Check firmware version. If it differs from the installed one, or there is a need to update the current one, continue the procedure.

Current firmware version
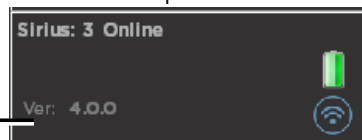
- In the ARENA program, in the "Change ID" tab of the "System Settings" window, select the number of the reprogrammable device from the drop-down list (or, if necessary, reflash all connected devices by clicking on the "All" option).
- Press the "Set boot mode" button.
- Successful switching of this device to boot mode will result in disconnecting it from the ARENA program. All LEDs on the SIRIUS display panel turn off, only the side lights are on.
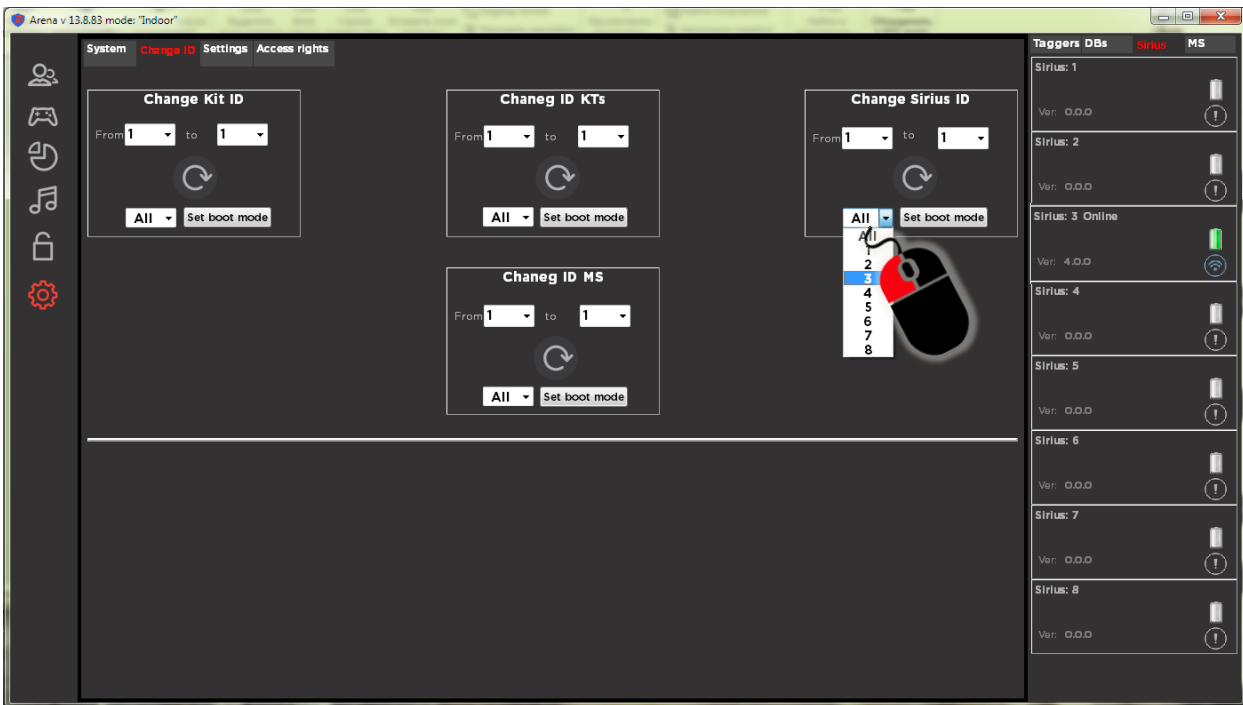
Select a SIRIUS Station number to put into boot mode

- Go to the BootLoader program. In the right pane, Station IDs should be visible. Now you can go directly to the firmware update.
- Using the File/Open dialog (or by pressing Ctrl + O) select the firmware file (miniMS_v_X) .lzt previously downloaded to the PC, where X is the firmware version). Click the "Open" button. If the file does not determine the device's ownership or the file is damaged, an error message will be displayed. To deselect a file - click the cross next to its name.
- With the correct choice of firmware, the "Start" button becomes active, by clicking on which the process of flashing microcontrollers begins. Progress bars at the same time show the percentage of completion of the operation. The process can be stopped by clicking on the "Stop" button.
- At the end of the firmware, SIRIUS Stations automatically go into standby mode (the panel LEDs light up and fade alternately in different colors), connect to the server, and information about them reappears in the status bar of the ARENA game devices.

If some devices fail during firmware, the procedure should be repeated.

11.4.   Multistation firmware update

As well as SIRIUS Station, the Multistation can be put into boot-mode only from the ARENA program.

 The sequence is as follows:
- Launch ARENA and BootLoader programs.
- Turn on Multistations that need to update firmware.
- Wait for its connection with the server and the appearance of information about it in the ARENA program.
- Check firmware version. If it differs from the installed one, or there is a need to update the current one, continue the procedure.

Current firmware version
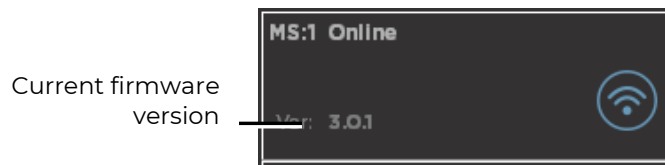
- In the ARENA program, in the "Change ID" tab - "Change ID MS" field, select the number of the reprogrammed Station from the drop-down list (or, if you want to flash all connected devices, click on the "All" option).
- Press the "Set boot mode" button.
- Successful transfer of devices to boot mode will be manifested by their disconnection from the ARENA program and, accordingly, by changing the connection display in the device cell on the status panel. At Multistations, the screens go out, only the side light is on.
- Go to the BootLoader program. In the right pane, Station IDs should be visible.
- Using the File/Open dialog (or by pressing Ctrl + O) select the firmware file (SUD_MS_vX.lzt , previously downloaded to the PC, where X is the firmware version). Click the "Open" button. If the file does not determine the device's ownership or the file is damaged, an error message will be displayed. To deselect a file - click the cross next to its name. The MS Video firmware in the current version of the device does not need to be downloaded.
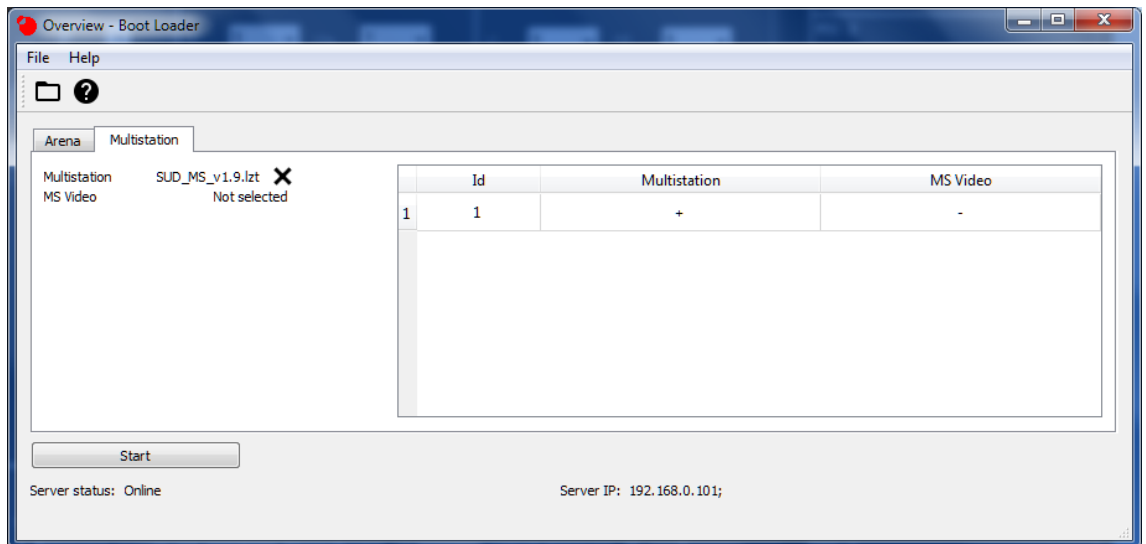
BootLoader program window with loaded Multistation firmware

- With the correct choice of firmware, the "Start" button becomes active, by clicking on which the process of flashing microcontrollers begins. Progress bars at the same time show the percentage of completion of the operation. All LEDs on the device go out. The process can be stopped by clicking on the "Stop" button.
- At the end of the firmware, the MSs automatically go into standby mode (the image of the company logo appears on the panels, and the side-lighting LEDs alternately light up and fade green), connect to the server, and information about them reappears in the status bar of the game devices of the ARENA program.

If some devices fail during firmware, the procedure should be repeated.

12.   Broadcast statistics on an external screen

To broadcast operational statistics of the game process, there is the LaserTagStatistic program, which is included in the delivery package.

The current version of the program is available for download at: https://lasertag.net/support/ section "Indoor/ Software for Android/ The program LaserTagStatistic for transfering statistics to an external screen, works in conjunction with the program for Windows".

The program is installed on any device (smartphone, tablet, PC, Android TV, set-top box) with the installed Android operating system version no lower than 4.1.2.

To install or update the program, you must:

- Check for LaserTagStatistic software on the device. If an irrelevant version is installed, it must be removed.
- Download the installation file of the program to the device (at the time the manual is being written the current version - LazerTag2.5.3.apk).
- Start the installation process by clicking on the installation file.
- Wait for the program to install and run it.
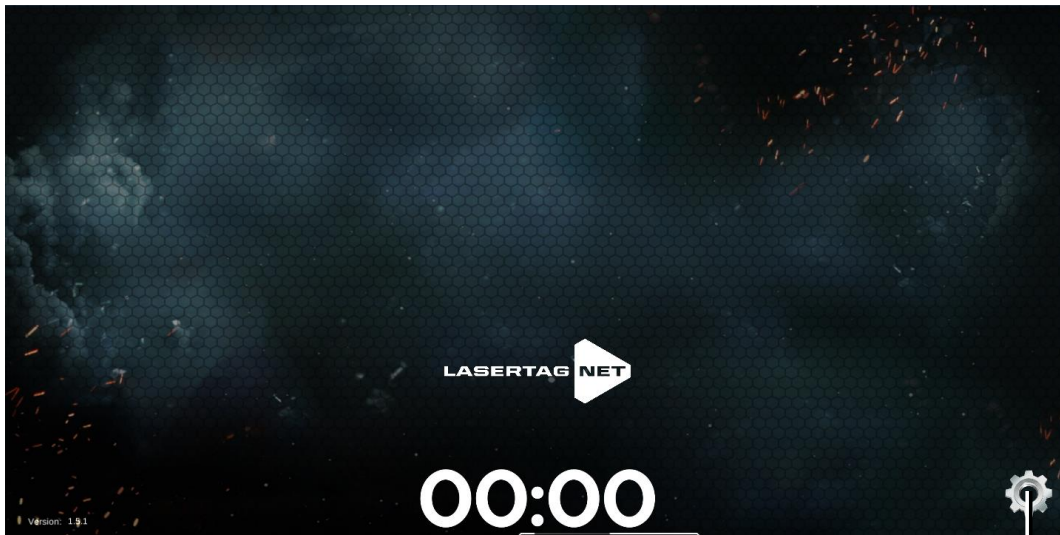
Button "Program Settings"

LaserTagStatistic start window

- In the program settings (click on the gear icon) set the IP address (192.168.0.101), as well as the port number (35790), through which statistics will be transmitted. The port number can be found in the ARENA program in the TV OUT Server tab.

IP address and port number
for recording in
LaserTagStatistic settings

System	Change ID	Setting	Access rights

TV Out server

Local IP: `192.168.1.100`   ● Auto power on   Enable

Port: `35790`   Disable

● Show timer

Delay in displaying players and add. devices, sec: `5`

Arena program tab "TV Out server"

- Save changes by clicking on the "Apply" button.

"Apply" button

IP `192.168.0.101`   Port `35790`

Version TV-out: 2.5.3
Version Arena:

00:00
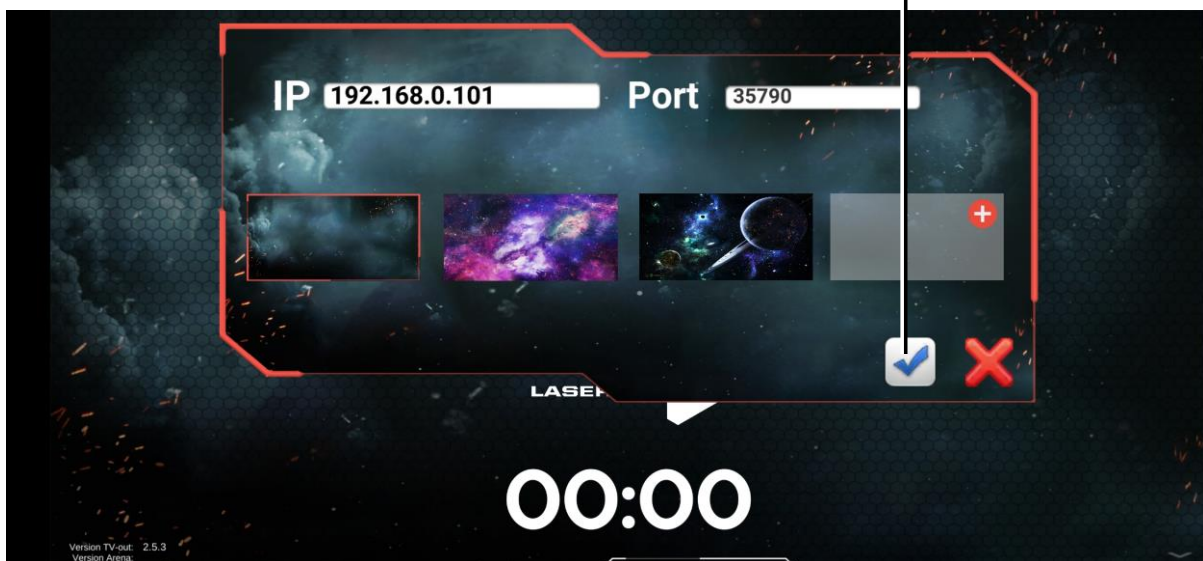
Enter computer IP and port number

- On the Android device, connect to THE LASERTAG Wi-Fi network by entering the password 2015LT2015 (the hotspot name and password may be different, depending on the router settings - see chap.8).
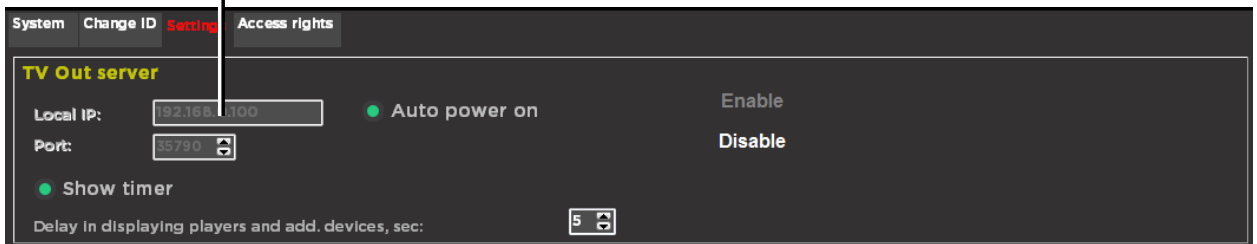- In the ARENA program, in the TV OUT server (System Preferences/Settings) field, use the green and red marks to select whether or not to display the game timer and IP camera in the LaserTagStatistic program window. In order to automatically turn on statistics broadcasting when the "Arena" program starts, you must select the green label for the "Auto power on" item.
- If the number of players is such that information about them does not fit in the LaserTagStatistic program window, the display is divided into several groups, the frequency of which is set in the "Display players delay" field (0-10 sec.)

Now, after starting the game in the ARENA program, the game statistics will be displayed on the screen of the android device, and the broadcast will be carried out in the language selected in the settings of the ARENA program.

Switching to the "Game Scenes" window in the ARENA program, you can select the type of statistics display - tabular or tiled, by clicking on the icon at the bottom.

Switch to tabular
display
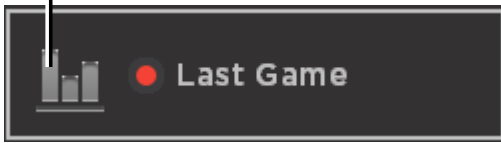
Switch to tile display

Switching the type of statistics display

Scenario title   Timer   Events log
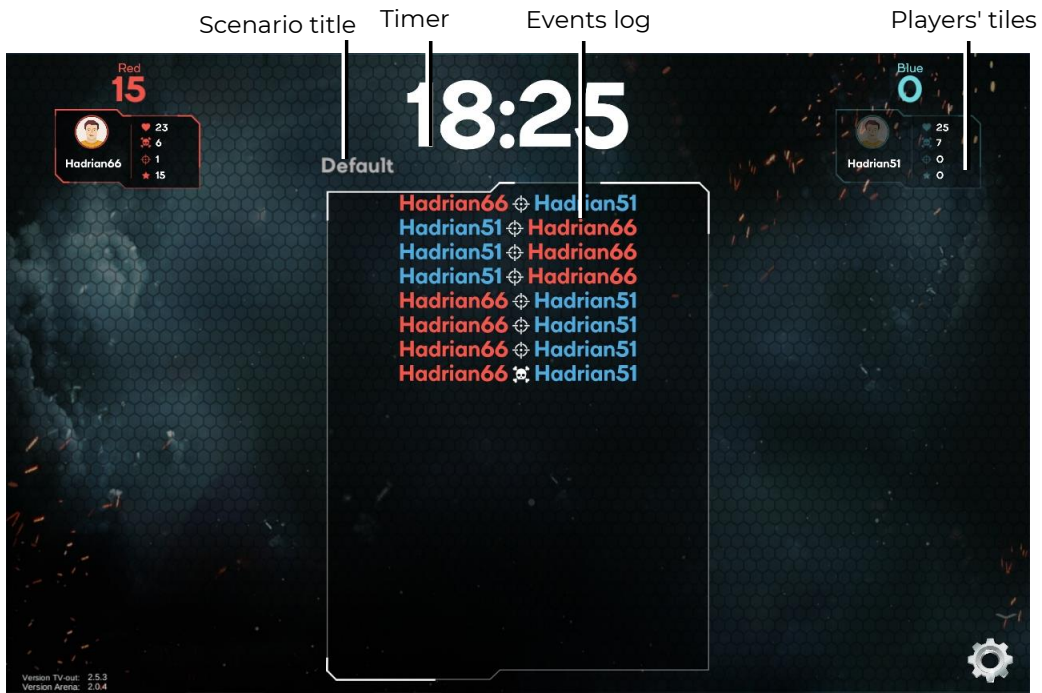
Players' tiles

Tiled display of game statistics

When tiled statistics are displayed, images of tile sets are displayed on the screen. Each tile kit displays the individual characteristics of players in real time.

Kit name
from the
standard list

Number of health points

The number of defeated opponents

Hit count

Number of scored points
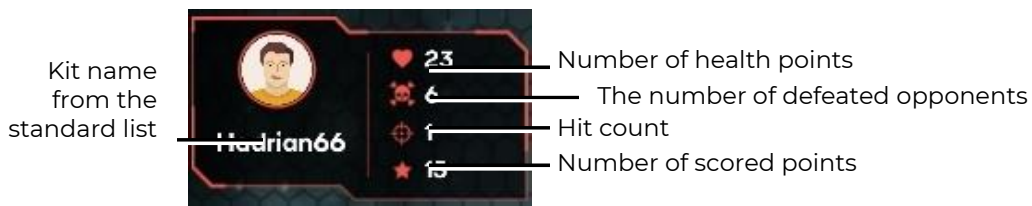
Decoding information on the player's tile

In the same way, the tiles of additional devices are displayed on the screen, if they are involved in the scenario.

In the central part of the screen a log of events occurring on the playing field is displayed, with the latest events displayed on the top line, gradually moving the list down. Information on which player, which team (font color) hit or hit another player, capture of the base, exposure to radiation, etc. is displayed on the screen.

Hadrrian51 from theblue team hit Hadrian66 from the red team

Hadrian66 from the red team killed Hadrian51 from the blue team

Had from the blue team captures base

Decryption of the Event log

With the tabular display of statistics, you can control 8 indicators: points scored, number of shots fired, damage done, number of opponents struck (frags), accuracy (ratio f fired shots to number of hits), number of additional device captures, damage received and number of defeats (deaths).

Team statistics tile

ID	Player	Score	Shots	Hits	Frags	Accuracy	Captures	Hits taken	Deaths
66	Hadrian66	15	40	100	1	10%	0	75	6
51	Hadrian51	0	7	75	0	42%	0	100	7
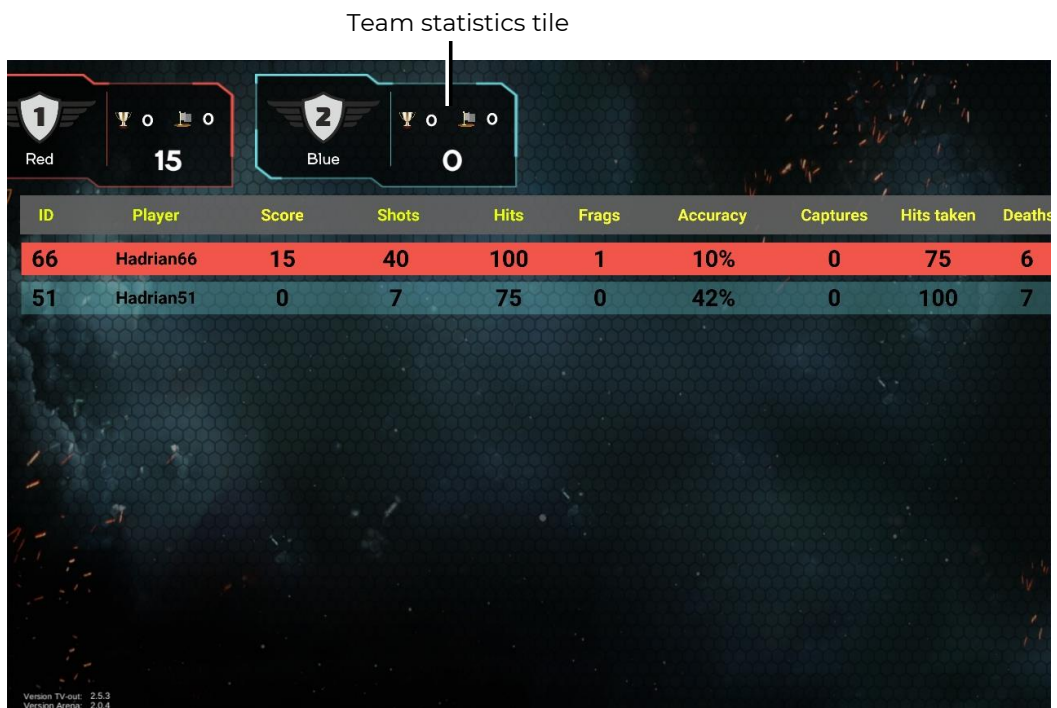
Gaming statistics tabular display

On the same screen tiles of team statistics with the current or final place, the number of points scored by all players of the team and average accuracy are displayed.

At the end of the round, it is possible to compare the performance of the teams in the last round and the previous one. To do this, in the "Game Scenes" window of the Arena program, it is necessary to mark the tiled display of statistics and click on the "Last Game" button.

Button "Show statistics of the last game"
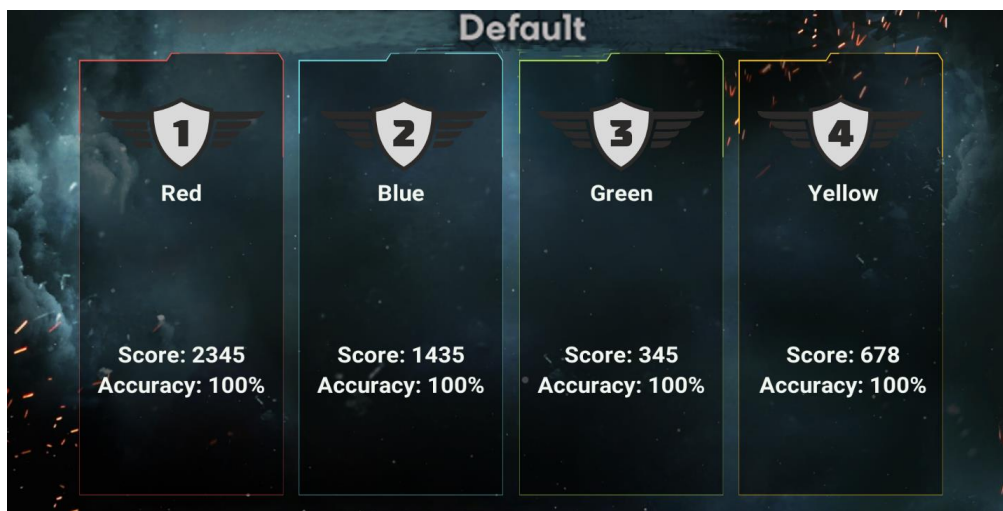
Display statistics of the previous game

13.   Safety procedures

The components of the laser tag equipment supplied by the company are complex devices that require careful and accurate handling.

Do not allow moisture to get into the devices. If nevertheless it happened - quickly turn off the equipment and dry it for 4-5 hours at room temperature.

Protect plastic equipment enclosures (blaster, vest sensors) from excessive mechanical load. If the equipment was stored in a room with minus temperature, keep it warm for at least 2 hours before turning it on and use it in heated rooms. This measure is necessary to avoid damage to the electronic components due to condensation.

Equipment for the indoor laser tag has a built-in battery, so you should follow the <u>safety rules when working with lithium-ion batteries</u>.

The lithium-ion batteries used in our equipment have a number of advantages over traditional batteries. They are light in weight, have a long service life and a large specific capacity per unit mass and volume. Storage and operation batteries do not pollute the environment; they comply with all international environmental standards.

However, lithium-ion batteries also have disadvantages. One of the main ones is sensitivity to overcharges and overdischarges. Recharge is usually accompanied by increased heating and bloating of the battery case and, as a result, its irreversible failure. The deep discharge of the device leads to the same result. To prevent negative consequences, each battery supplied by our company is equipped with an internal circuit protection against overcharging and deep discharge, as well as against exceeding the permissible temperature (above +90 °C).

However, the safe handling of Li-ion batteries should be payed serious attention.

Do not use the battery at high temperatures (for example, in direct sunlight, near a heat source or open flame) - overheating increases the gas pressure inside the battery, and this can lead to an explosion or at least shorten its service life. When the battery cools below 0°C, the power decreases to 40-50%. Maximum allowable temperatures at which lithium-ion batteries can be used: from –40°C to +50°C.

Do not use the battery under static electricity conditions - protection devices may fail and problems may arise in the safe use of the battery.

Do not squeeze, throw, or expose the battery to mechanical stress.

Do not short-circuit the positive and negative terminals of the battery with metal objects or wires.

When connecting multiple lithium batteries, use batteries from the same manufacturer - of the same rating, in the same technical condition.

Do not use the battery without an electronic protection circuit.

Do not reverse the polarity of the battery terminals.

Do not connect the battery to devices that are not designed to be powered by it.

Do not use bloated batteries - they must be replaced.

Do not disassemble the battery or puncture it with sharp objects - it may become depressurized and leak, overheat and catch fire.

Do not immerse the battery in water, do not throw it in a fire - it may explode!

Do not solder the battery directly to the plane.

Do not bring the battery to a minimum charge. Frequent recharging is preferable - this does not harm the battery.

Charging a battery.

Use a ventilated and fire-safe room to charge the batteries. If the batteries could ignite, they can't cause a fire in the entire room.

Burning lithium-ion batteries cannot be extinguished with water (hydrogen is formed) and carbon dioxide fire extinguishers (lithium reacts with carbon dioxide). You can use dry sand, salt, baking soda, as well as cover the burning battery with a dense heat-resistant cloth. Therefore, we recommend storing sand near the battery charging point.

Do not charge non-rechargeable lithium batteries! An attempt to charge these devices can cause an explosion and ignition, which spread toxic substances.

❗ **If the battery is damaged, do not recharge it!**

Use only chargers that are designed for this type of battery and which were equipped with the delivery.

❗ **Do not use the power supply of the router to charge the batteries of laser tag equipment!**

The temperature mode of the charge of lithium-ion batteries affects their capacity, which decreases when charging in the cold or in the heat. The charge can be carried out at an ambient temperature ranging from +4°C to + 40°C, but the optimum charging temperature is +24°C.

Before using the charger, check the correctness and quality of the connection of all wires. If any wires of the charger are damaged, they must be replaced before using the device.

When charging, install the equipment on a flat, stable, non-combustible surface. Remove nearby flammable objects.

When charging equipment with a built-in battery, the electrical safety rules must be observed.

It is not recommended to keep the battery charger in a power outlet if it is not being used for its intended purpose at this time.

When unplugging the device from the mains, unplug it from the power outlet by holding the plug, not the power cord.

❗ **Do not leave equipment unattended while charging!**

If a specific odor, heat, smoke is released when charging the battery, or the case is deformed, immediately disconnect the charger from the network, and the battery from the charging device.

The charging cycle for fully discharged blaster-vest batteries is 5-6 hours. Full charge is achieved after the voltage reaches its maximum value, and the charge current decreases to 0.1 ... 0.07 A depending on the battery model.

If the cell swells when charging, then never puncture the element, especially when it is still hot. It should be placed in salt water and wait until the element cools down. After cooling, carefully pierce the outer shell, and then place the cell in salt water again. After that, the battery must be utilized.

In the event of an emergency , lithium cells may be damaged by short circuits inside. Moreover, the element itself may seem whole. In any case, it is better to remove the battery and watch it carefully for 20 minutes.

In case of depressurization of the battery and electrolyte contact with hand skin or eyes, immediately rinse the affected area with running water for 15 minutes and consult a doctor. Otherwise, it may cause a chemical burn, partial or complete loss of eyesight.

Storage and disposal of batteries.

Lithium-ion batteries are not subject to long-term storage and are designed for active continuous operation. From the moment of manufacturing, their service life is 2-3 years, regardless of the intensity of operation.

If there is a need to store unused batteries for more than 1 month, they must be charged up to about 50%. Long storage in a discharged condition can lead to battery failure.

Store at +5°C... +20°C (preferably +5°C) in a place protected from direct sunlight.

Do not store the battery in rooms with high temperature or in rooms with high humidity.

Do not store the battery with metallic objects such as paper clips, pins, etc.

Battery protection circuits have a low internal consumption, but nevertheless sufficient so that the battery voltage can decrease to 2.5 V in a few months. Therefore, if the battery is not used in cycling mode, it must be recharged periodically (about once every 6 months).

If during storage of the battery you notice that it is very hot, hissing gas escapes, the appearance of caustic white smoke, then immediately move it to a place safe for people. If electrolyte spills from the battery, do not allow it to come into contact with skin, ventilate the room, and dispose of the battery.

The lithium contained in Li-ion batteries melts and boils at a relatively low temperature. When water enters, a reaction occurs with the release of hydrogen. Accordingly, such a battery is potentially explosive during prolonged uncontrolled storage and can cause environmental damage.

In order to avoid undesirable consequences, the used elements must be collected and delivered to specialized recycling centers. Meanwhile, they are ought to be packed in such a way as to avoid electrical contact with the container or other battery. Pack leaking elements in such a way as to locate the leak. Use protective equipment: gloves, eye protectors, appropriate work clothing, a respirator, and sealed plastic bags.

! **Do not dispose of lithium-ion batteries in trash cans!**

14.   Frequently Asked Questions

- *How to change the volume of sounds played by a blaster speaker?*
  After connecting the kit, open the "Game Scenes" window, click on the gear icon in the "Scenario Selection" field, and in the "Scenarios Selection" window in the "General" tab in the "Kits Settings" field, left-click the gear icon as well. In the left part of the window, select the type of settings (general, team or individual) and in the right part of the "Settings", moving the left-right slider, set the desired volume level.

- *How to name a player?*
  You can only assign or change a player's name after he's been assigned to one of the teams. To do this, right-click on the kit ID in the team column, select "Change player name" and enter a new nickname in the window that appears. It must consist of no more than 20 characters, and not contain the characters # , ! and a tab character.

- *I have the Windows 10 operating system. Why is the program not working correctly?*
  The program is launched in the Windows 10 operating system as an administrator: right-click on the executable file ARENA.exe and select "Run as administrator".

- *How to remove negative values in statistics?*
  On the tab "Statistics of players" choose - "Performance tuning" ⚙. Assign positive or zero points.