LASERTAG NET

Guidance note

Based on the Wi-Fi platform

Updated:
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lasertag.net

Chapter list

Lasertag is a fascinating military-sports game in real time and space, which develops players' accuracy, speed, physical endurance, quick thinking, tactical wit and team spirit.

The main aim of a team – is to complete the mission (depending on the scenario) faster than the opposing team, hitting the sensors of the opposite team players by tager ray, and not get a hit by yourself at the same time.

"Lasertag.net" company produces different kinds of equipment for laser tag games.

The main equipment units:

- A tager and head band as a set;
- Battery charger;
- Remote control;
- Domination Box;
- Utility Box.

There also may be used electronic simulators like "tripwire mine", "electronic explosive device", artefact, individual medical kit, target etc. Each player gets wireless game kit that includes tager and head band.

The game is controlled by the remote control and computer programs, installed on a computer or a smartphone. These programs allow get and demonstrate the statistics of the game process.

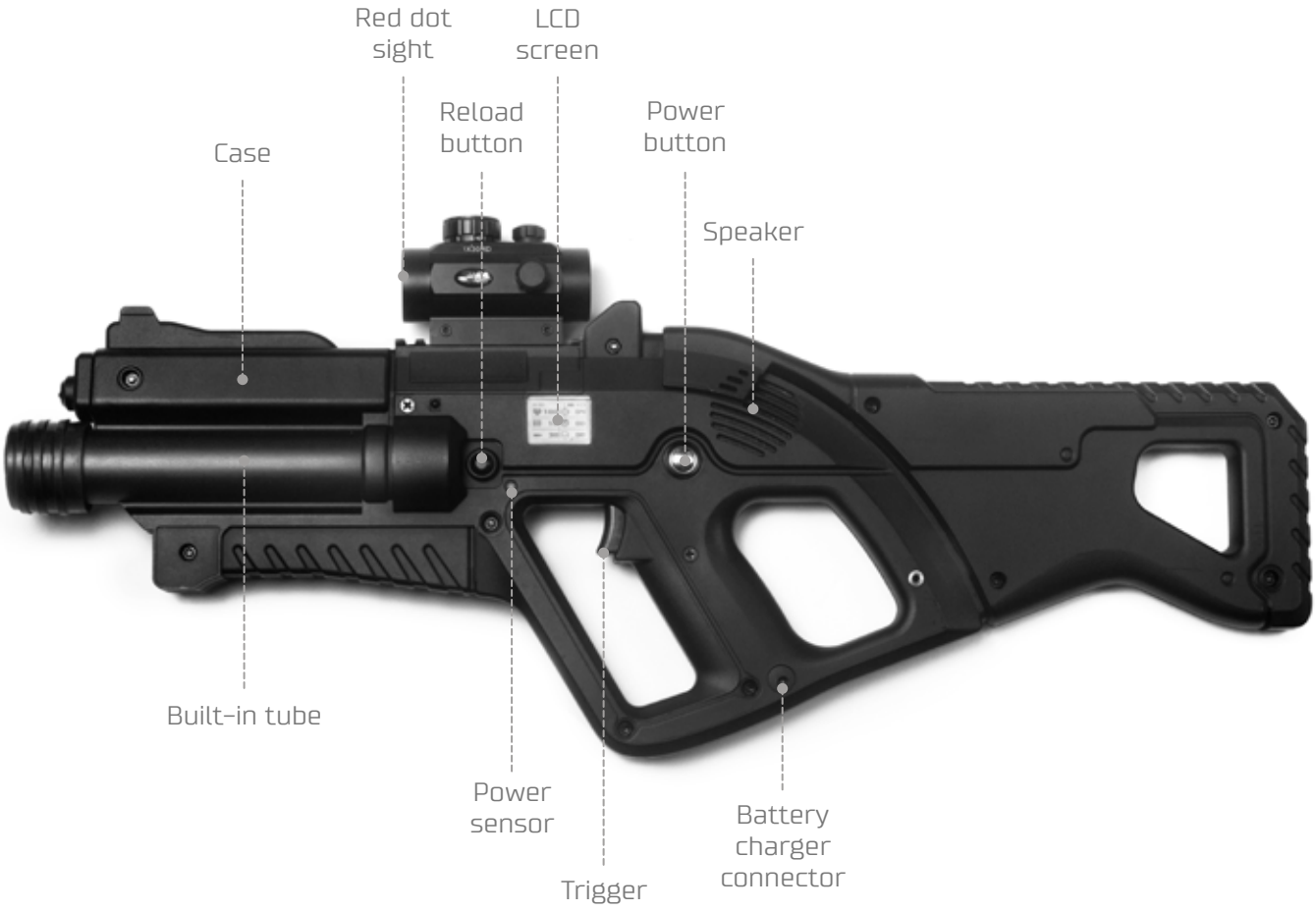
1. Tager

The tager is a device that emits directional focused pulses of harmless infrared light with a carrier frequency of 56 kHz and a wavelength of 940 nm.

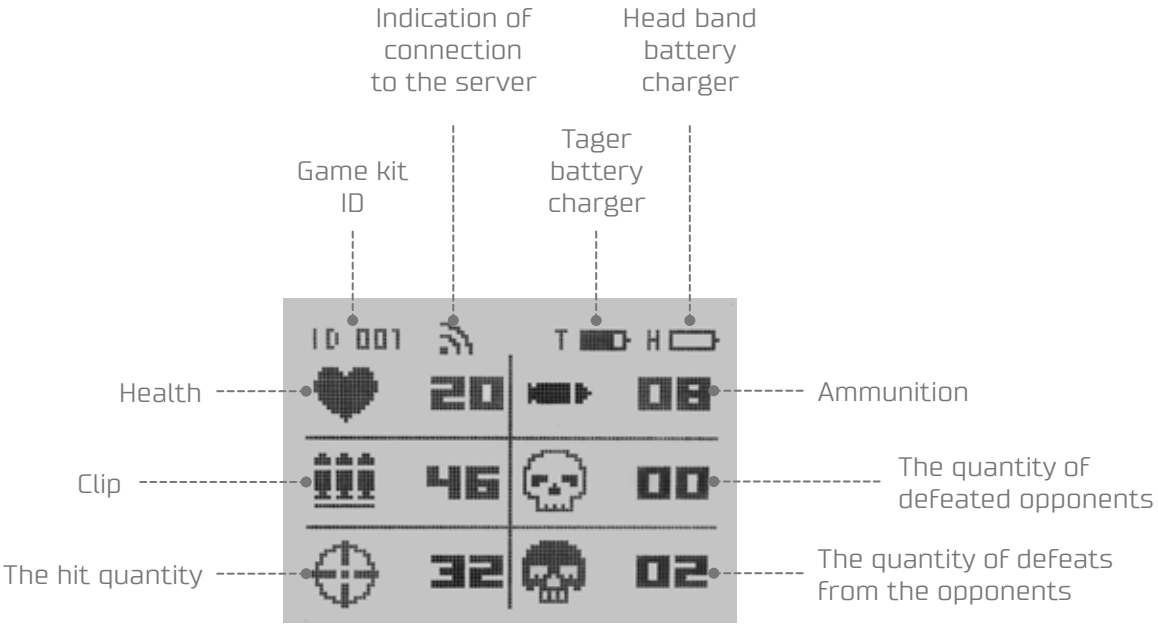
As the radiators IR diodes TSAL6100 from Vishay are used. To increase realism, the IR beam is duplicated by a visible light beam during a pulse.

If an infrared ray hits any of the four sensors on the opponent's head band, the hit alarm is triggered, which is indicated by the flashing of the bandage RGB indicators, vibration and sound notification of a «wound» or «defeat» of the player.

In the absence of health units, the player is disconnected from the tager, and his game kit can't participate in the round before it`s "recovery" by the Utility Box or by other devices, depending on the scenario. The tager and the head band have wireless connection via radio channel on a frequency of 868 MHz. For configuration, management and getting statistics via the server and computer programs, a Wi-Fi channel is used.



The main elements of tager by the example of heavy machine gun Falcon 2



The main menu of LCD screen

1.1 The purpose of tager's elements

	The element's name	Purpose	Note
1	Case	Contains all elements of electronics, including Li-ion battery	
2	Tube (optic system)	Is used for focusing infrared ray and shot flashes simulation	Consists of infrared diode, optical light emitted diodes, and lens system
3	The button and power indicator	Are used to switch on the tager and signalize about readiness for work	
4	The trigger	To switch the micro switch contact and simulate a shot	
5	Red dot sight	For aiming to the opponent's head band hit sensor	Is completed according the individual order
6	Reload button	To simulate the weapon reloading while running out of ammunition	
7	Speaker	For voice notifications, imitation of shot sounds, misfires, reloading, etc	
8	The battery charger connector	To charge the built-in battery	
9	LCD – screen	For visual information about ammunition, health, hitting, etc.	Is completed according the individual order

1.2 Service mode

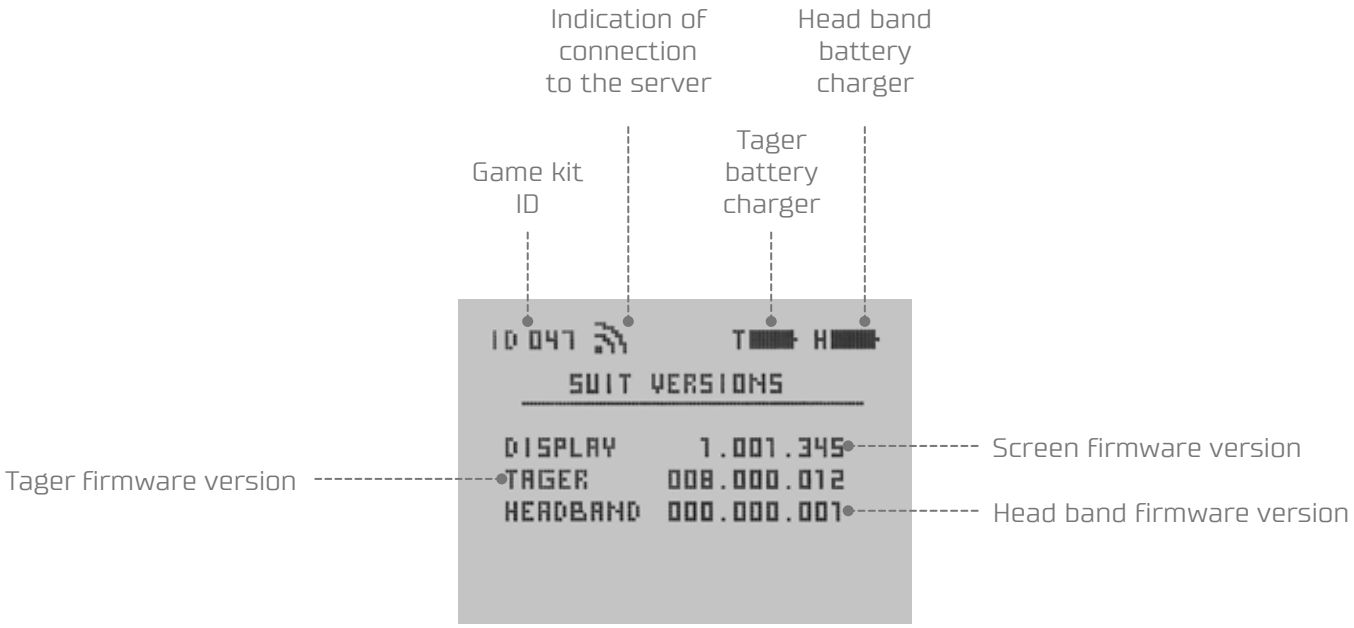
In this service mode the screen displays the game kit ID, the status of connection to the server, the charge of tager and head band batteries, the version of the screen, tager and head band firmware.

This mode allows:

- To change the tager ID number
- To set the tager ID to any head band
- (assign any head band to the tager)

Service mode activation:

1. Place the head band in close proximity to the tager (up to 5 meters) and turn on its control unit.
2. Pull the trigger of the tager and then press the power button for 3–4 seconds. You'll see the green light diode of power indicator and tager screen:



LCD screen in service mode

3. Release the trigger and the button. Switching to the service mode can also be controlled by the LED illumination of the shot lighting – when the trigger is clicked, they should light up at a lower brightness.

Tager's ID changing

Each game kit has its own ID, and the ID of the tager and head band of one kit should be related. Service mode gives you an option to change tager's ID.

To change tager's ID you should:

1. Pull the trigger and press reload button at the same time and hold for 8–9 seconds.
2. After the buzzer sounds, release the trigger and the button – the tagers ID will be reset to the number.
3. Press the reload button shortly to set needed number. The ID changing will be accompanied by buzzer sound.
4. Switch off the tager by pressing the power button.

When the tager's ID is changed its necessary to assign the head band to the tager.

5. Switch on the head band – its indicators light up with different colors.
6. Switch on the tager in service mode (pull the trigger and press the power button) and fire a shot to any sensor of the head band. To avoid the accidental binding to the nearby head bands the capacity of radiating infrared ray is 1%, that's why you should fiЦЦre point-blank shot.

7. In case of successful binding the head bands RGB-indicators will flash with white light. That means that the head bend got its ID.
8. Switch off the game kit by pressing the power button on the tager and headband.

1.3 Standby mode

The game kit is switched on by pressing the tager's power button for 3 seconds and pressing the power button of the kit control unit.

If the ID numbers of the tager and the head band match (otherwise you'll hear short buzzer sound every 3 seconds), you 'll hear a sound notification "Check the weapon and get ready". The headband reacts by the smooth flashing light of the color of your team. The game kit is ready for configurations or for game.

In this mode the instructor using the remote control can change the team color, replenish ammunition, add health, assign player's role in the game etc., and also start or stop the game round.

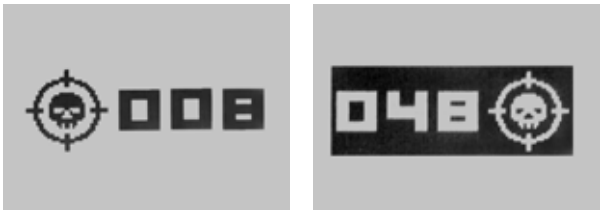
1.4 Game mode

The game may be controlled by both – the remote control and the program installed on the computer. To run the game using the remote control the game kit must be activated:

1. Switch on the kit and make sure that the tager and the headband are banded (in this case you'll hear the sound notification "Check the weapon and get ready", headband indicators react by the smooth flashing light of the color of your team).
2. Direct remote control emitter to any of headband sensor and press the button "New game".
3. After successful activation you'll hear sound notification "Go-go-go!", RGB-indicator of the headband lights up with flash of the color of the player's team.
4. The game kit is ready for a game round. A player can hit opponents with the infrared ray of his tager, use other game devices and be defeated by his opponents by hitting in the sensors at the headband (vest, tager).

Game kit setting and control via computer program is described in chapter 16 of the given guidance note.

Within the game round on the tager screen you can see not only the main menu that gives the information about the health, hit, battery and game kit ID, but also you can see the ID of your hit opponent and the ID of the player who hit you.



The screen displays the ID of the player's "victim" and "offender"

1.5 Boot mode

The boot mode is used to update the firmware of the tager's controller, the tager itself and the headband controller.

The firmware is updated with the Boot-Loader program, which must be installed on the computer (available for download, and the router that connects the server with the kit. Router configuration and the firmware process are described in Chapters 3 and 15 of the given manual.

The aim of the tager is to hit one of 4 sensors of the opponent's headband by focused infrared ray. By pulling the trigger the tager fires single «shots», a burst of 3 pulses and a continuous burst until the magazine is empty.

To change **the shooting mode** set the game mode for tager (it means when you pull the trigger the tager should fire shots):

1. Press the the reload button for 5 seconds and wait until the reloading sound appears.
2. Release the button
3. Check the mode by pulling the trigger (modes are changing in cycles: a burst of 3 pulses – single shots – continuous burst).

Repeat the procedure if necessary.

By default, for each new game the tager is equipped by 7 clips of 30 cartridges.

When a player empties a clip by pulling the trigger, he hears the sounds simulating a misfire. To return the shooting, it is necessary to press the reload button, the special sound of the shutter is played, and the tager is ready for game again. Recharging can also be done before the cage is emptied.

All the tager's parameters (the clips and cartridges quantity, recharging time, firing interval, player invulnerability interval and so on) are set with the help of a programs installed on the computer, tablet or smartphone.

1.6 Red dot sight

Red dot sight is a lens or a lens system that projects the aiming mark on the player's eye by the parallel flow. As a result, it is necessary to combine just two points — a glowing mark, which you can see through

The elements of a sight on the example of model Bushnell 1x0 RD

the eyepiece and the goal itself. Moreover, even if you move your glance aside, you will anyway see the aiming mark.

Red dot sights can be open and closed.

The Bushnell 1 × 0 RD aiming mark model is red and green dots. The color and the brightness of the aiming mark is set by means of a 12-position resistor.

To fix the sight on the tager's body you have to insert it into the Picatinny top rail and tight the takedown screws. Switching power on (CR-2032, 3V lithium battery) is made by turning the resistor in any direction, with that the red or green aiming mark should come to light.

Horizontal and vertical adjustment of red dot sight angle correction is made by the adjustment screws turning clicks, which are closed by protective tops.

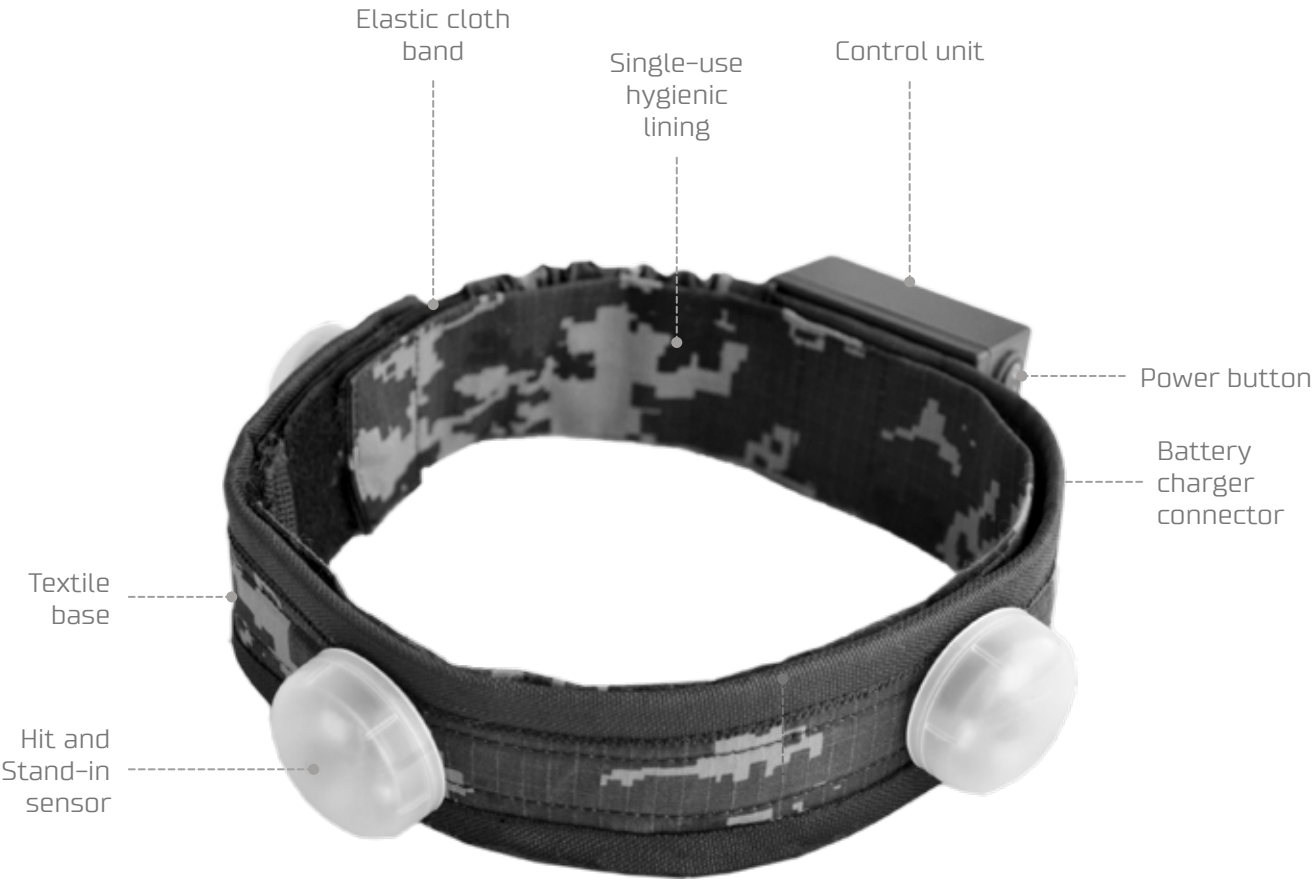
The check fire of the tager with fixed sight can be made using an electronic shooting range or other set of the tager-headband.

2. RGB-headband

Each game kit comes with a wireless RGB-headband. It consists of an adjustable cloth band equipped with the control unit, 4 hit sensors (one of which is integrated into the control unit) and a single-use hygienic lining.

The headband textile base

The headband textile base consists of



Headband V3.0 elements

few layers – outer camouflage, frame belt,

PVC band for electronic blocks protection from the human body evaporations, the inner layer is made of the polyester lining and the textile fasteners «Velcro» for banding a single-use hygienic lining. The lining can be easily removed for washing if it's needed.

To adjust the size of the headband, use the textile fastener on the textile base. The elastic cloth band helps to fix the headband on the player's head.

Control Unit

Inside the control unit, there is an electronic card, on which one of the hit and stand-in sensors is installed, as well as the headband battery, charged by the charger through a special connector  . Here you can also find the power button  and vibration device.

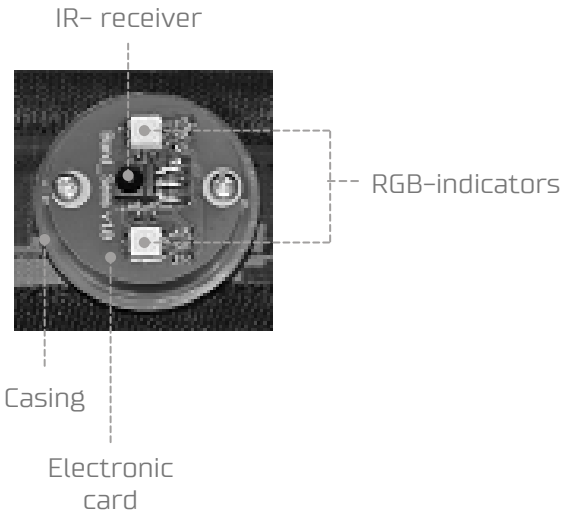
Hit and stand-in sensor

The sensor itself – it's an electronic card in transparent casing, on which the IR-receiver (TSOP 4856 of Vishay), RGB-indicator and other auxiliary elements are placed.

The sensors are uniformly spaced along the circumference of the headband, which allows receiving the opponent's gunshot signal from around 360 degrees, while eliminating the blind spots.

The IR receiver captures the infrared ray of the opponent's tager.

Depending on the task the headband RGB-indicators can be set to light in one of five colors – red, green, blue, yellow and white. They can show the color of player's team (it can be changed with a help of the remote control), signalize about the hit, react on switching on, binding to the tager and so on.



The main elements of Hit and stand-in sensor

2.1 Headband activation

The headband with the sensors and the tager are connected wirelessly. The game kit operating frequency of the radio set is 868 MHz. The headband is switched on by the power button placed on the control unit. Meanwhile the headband switches  to the search mode and start searching the tager with an identical ID. In the case of its absence, the headband gives 3-colored light every 5 seconds.

When a «related» tager is detected, the indication sensors flash the color of the player's team at a rate of 1 second. In the game mode, the headband electronics constantly checks the presence of weapons. If at this moment the tager with the identical ID is switched off, or located at more than 3-meter distance, the indicators will also be lit by a 3-color flashes every 5 seconds.

2.2 Game mode

At the start of each game round, after pressing the «New Game» button on the remote control, the RGB indicators respond with a short flash of the team's color.

The headband hit sensor has the following reaction for hitting:

If the player still has heath, RGB-indicator responds with a flash of the team's color, short vibration and sound notification about injured player ("I am injured" or "the last life"). For some period of time (this period is set by computer program) the player is invulnerable. This option was implemented to exclude the possibility of "dropping-out" the player with the burst of shots.

If the player with the only one life left was hit, the headband reacts with a constant flash of the team's color and a long vibration. The tagers speaker announces: "The player is gone – get back to the base", the device stops to emit pulses and the player should go to the base for recovery. The headband indicators are switched to the flashing mode in 10 seconds.

3. Wi-Fi router

As a wi-fi unit in the set of «Lasertag.net» laser tag equipment the N300RH device from the company Totolink is supplied. The router is made on the base of the network processor Realtek RTL8196E-CG and supports data transfer up to 300 Mbit / s.

The router is equipped with outer pow-

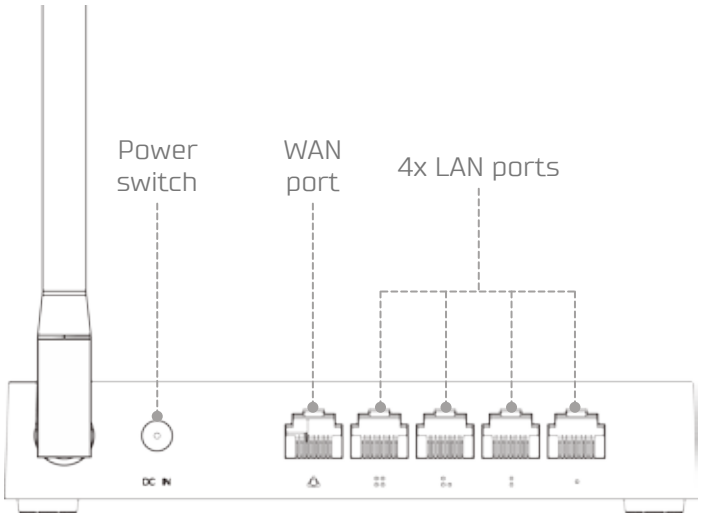
The Totolink N300RH appearance

er supply unit, UTP cable and two antennas with 11dBi amplification gain. The Reset button resets the device to the factory settings. The WPS button (if the operation system is Windows 7 or higher) allows quickly connect to a secure Wi-Fi network. There is no need to input the security key, just press this button.

There are 4 LAN ports, a WAN port for connecting the provider cable and a connector for connecting the power supply on the terminating panel.

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

3.1 Router configurations



Router LAN – switches for computer

If router configurations were reset for some reasons (for example you accidently pressed the Reset button), you should set router by yourself (on the base of firmware N300RH V4 router):

1. Check and if necessary, set the computer to receive an IP address automatically.

2. Download file with router configurations totolink_config.dat and save it to any directory of file system on your computer.

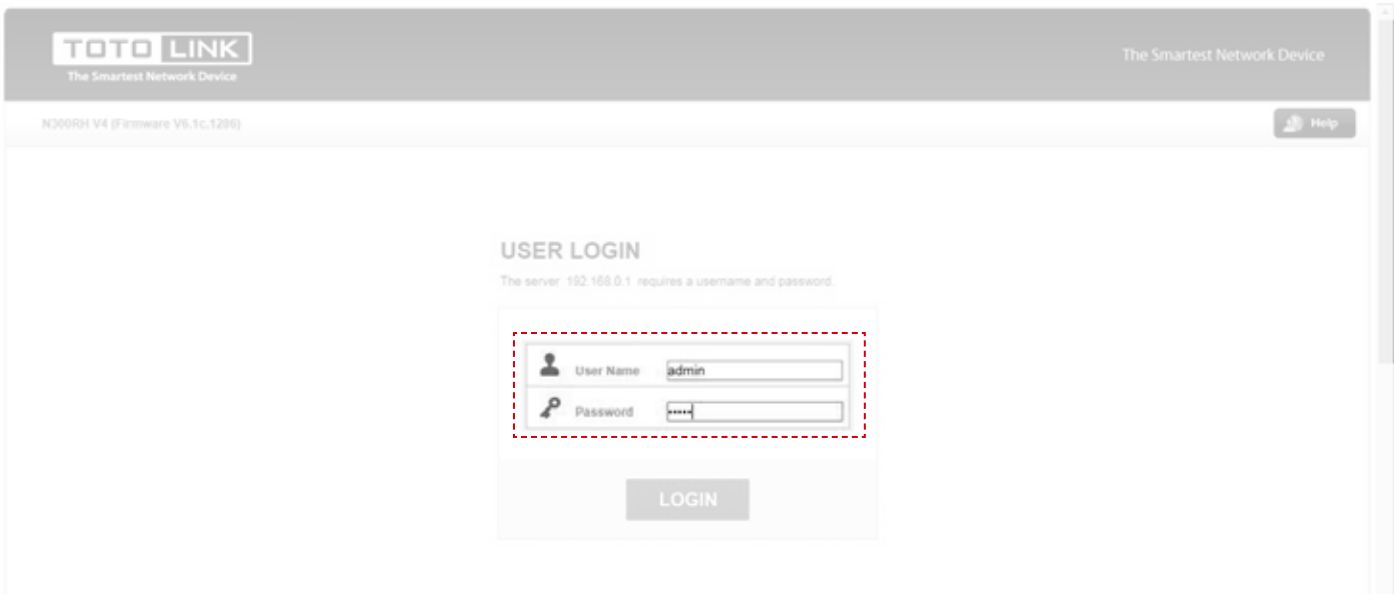
3. Using one of 4 LAN-connectors connect the router to the computer's network card by UTP cable that is included to the kit.

4. Arrange the antenna vertically. Turn on the power of the router.

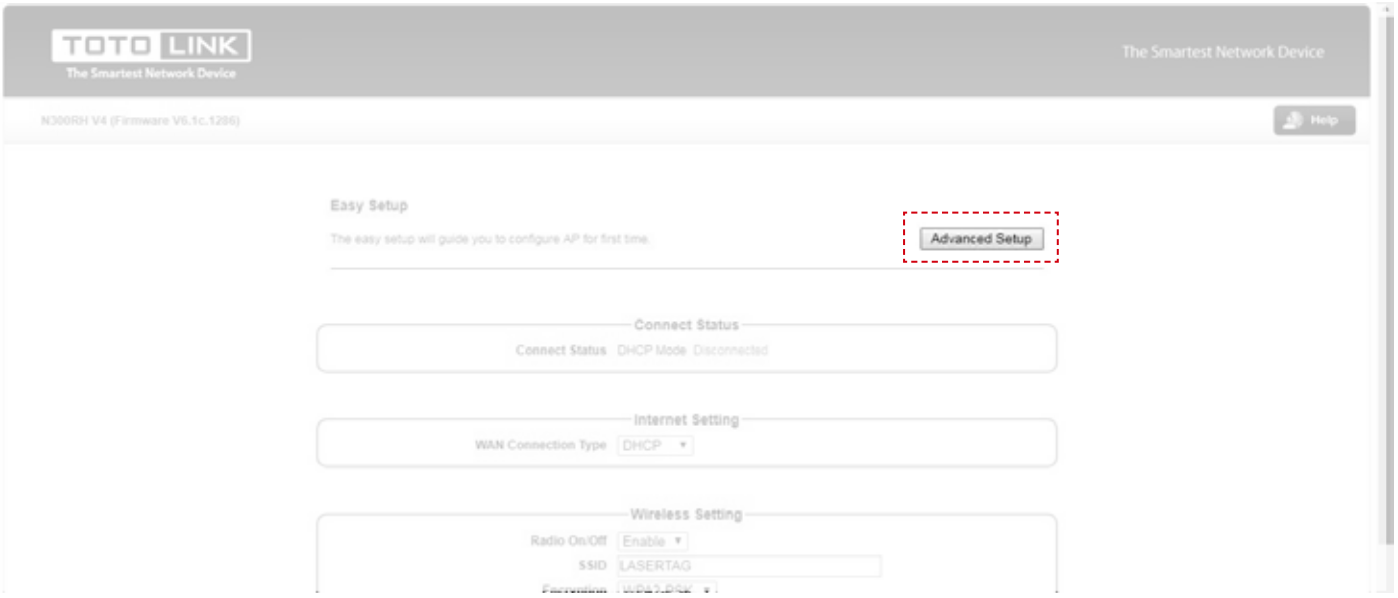
5. In the input line of any browser installed on your computer (Opera, Google Chrome, Internet Explorer) input the address 192.168.1.1. If 192.168.1.1 isn't opening, you should reset the router to the factory settings. Press the RST-WPS button on the front panel and hold it for 15 seconds. Try to open the configuration page again.

6. In appeared boxes input User Name: admin, Password: admin.

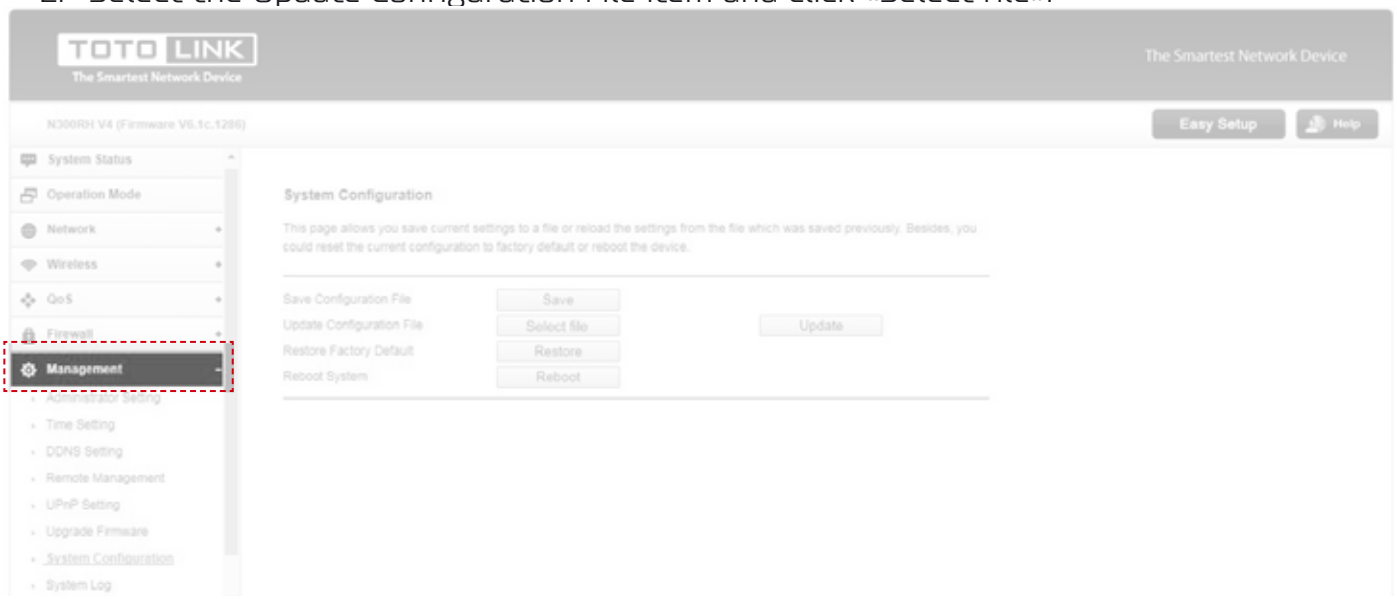
For automatic configuration:



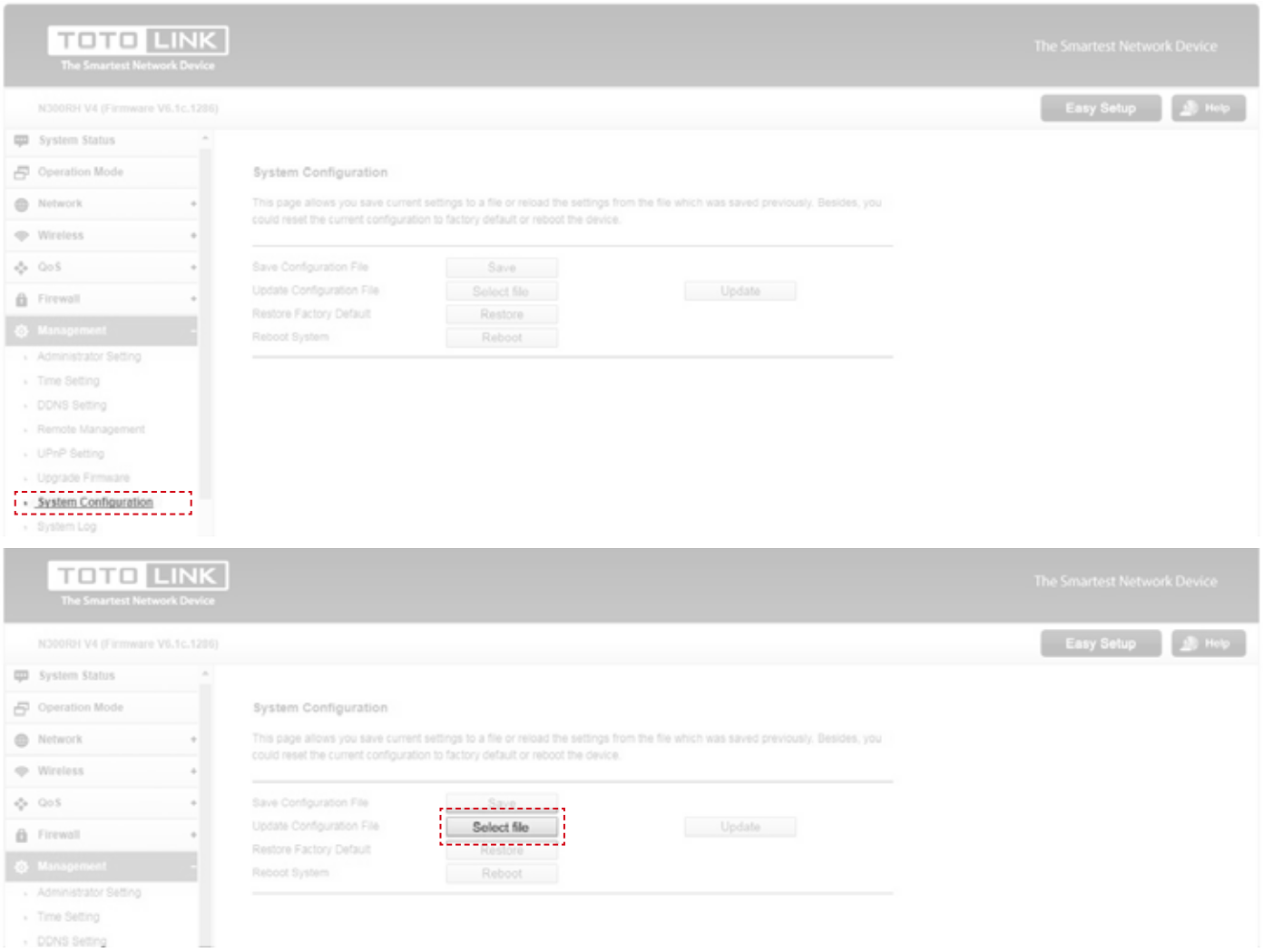
7. In the Easy Setup box, select Advanced Setup mode.



1. In the window that appears, select the menu item Management / System Configuration.
2. Select the Update Configuration File item and click «Select file».



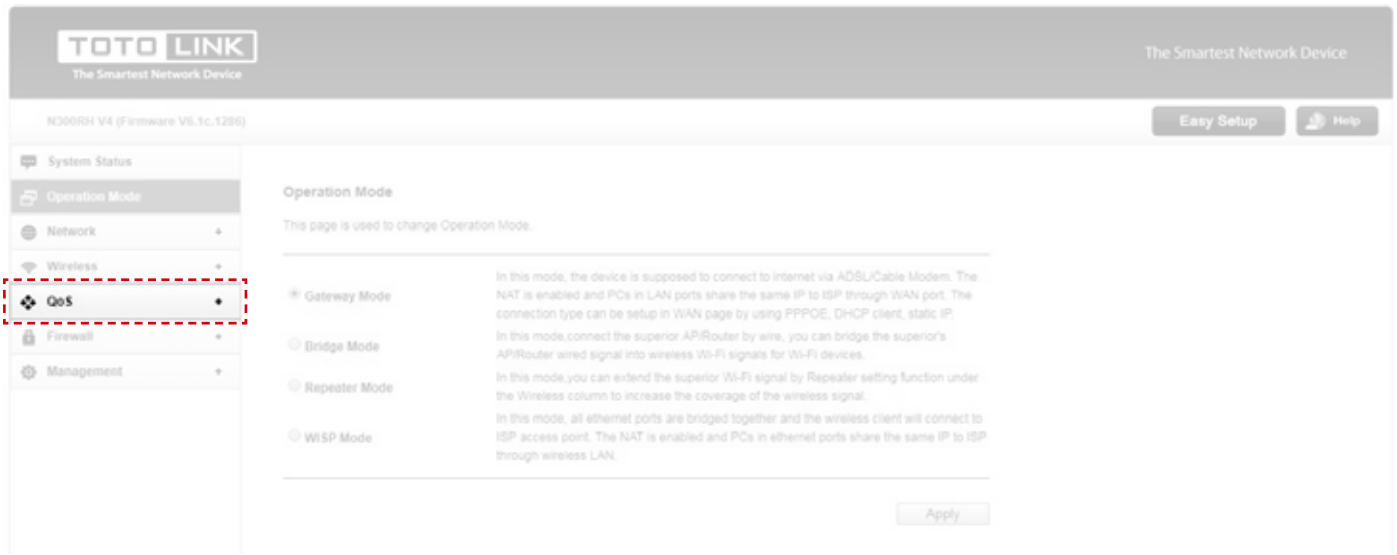
3. In the file system of the computer find a saved setting file and click the «Update» but-

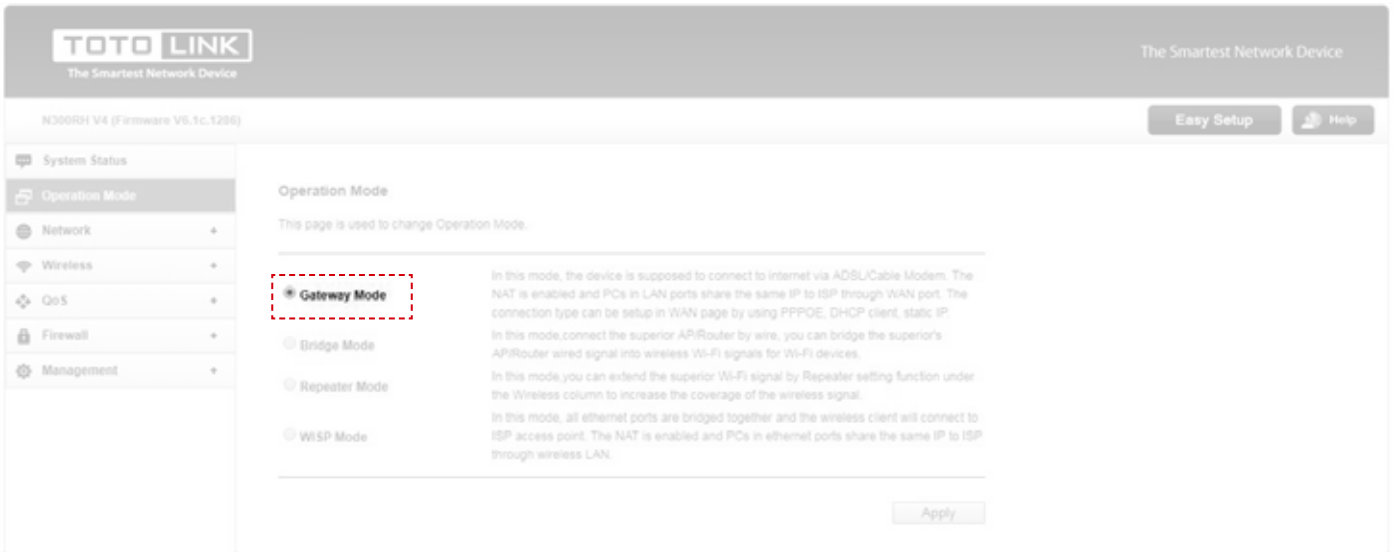


ton. In 65 seconds, the router will reboot with the new settings and address 192.168.0.1.

For manual configurations:

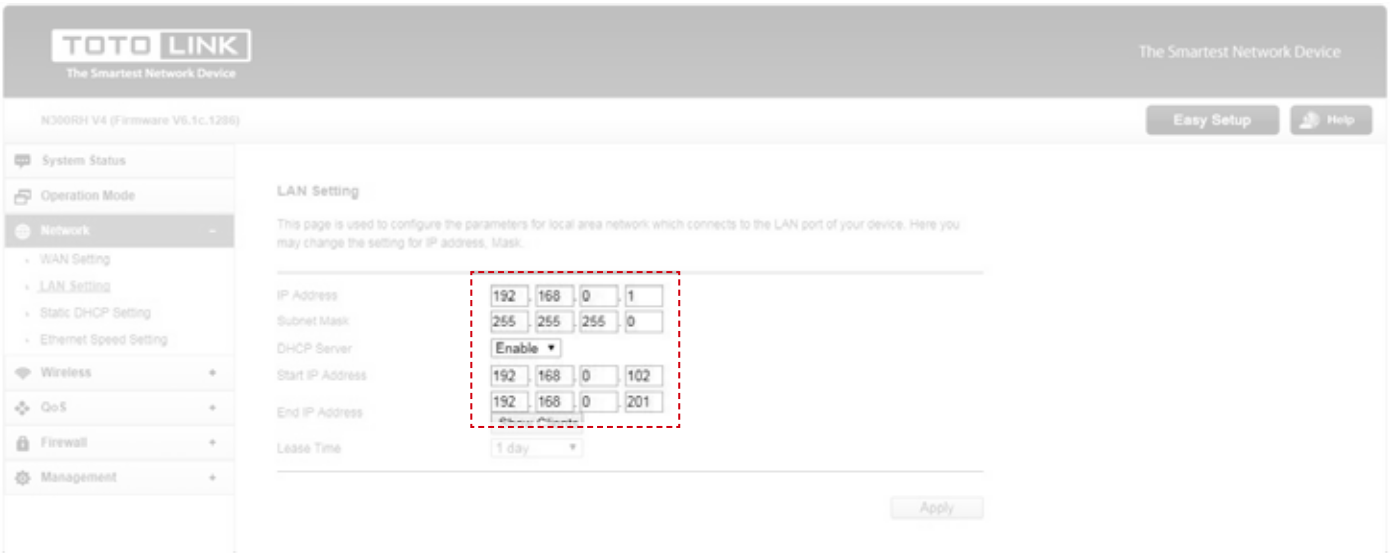
1. Select the Gateway Mode in the Operation Mode menu. Click on the Apply button.





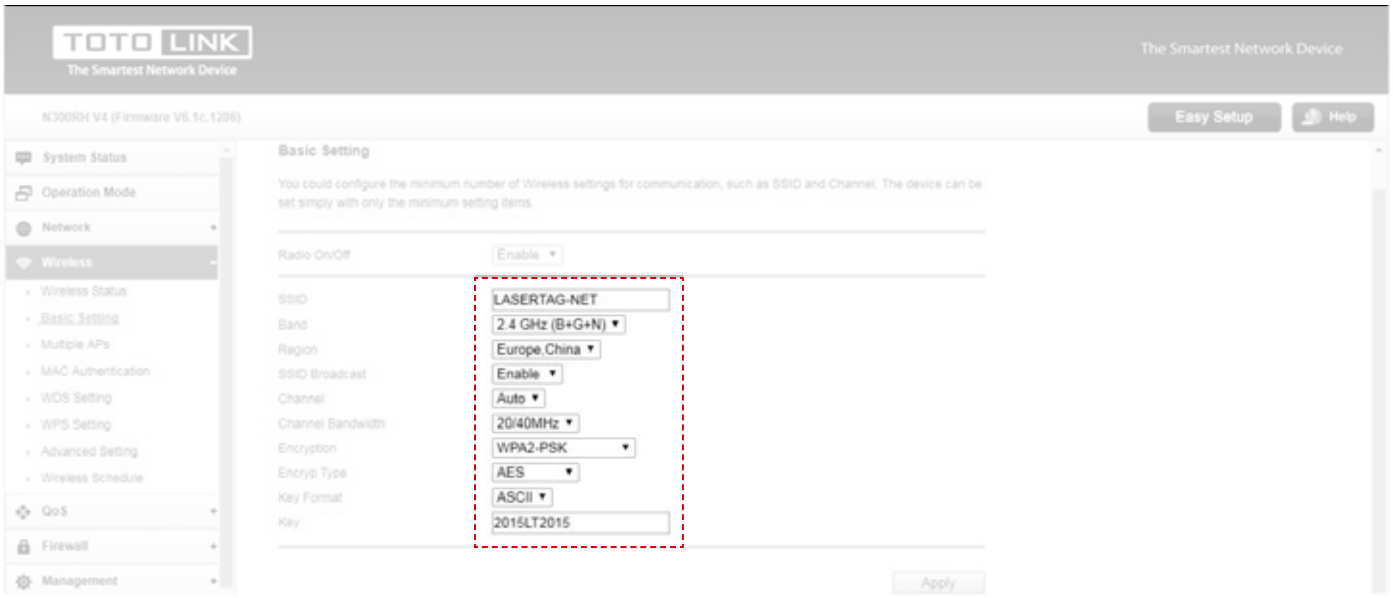
2. In the Network menu, select LAN Setting and set the parameters:

- IP Address (IP address of the access point) – 192.168.0.1;
- Subnet Mask (mask) – 255.255.255.0;
- Start IP Address (initial range of the server's IP address) – 192.168.0.100;
- End IP Address (the final range of the server's IP address) is 192.168.0.200;
- Click «Apply» button to apply the entered settings.



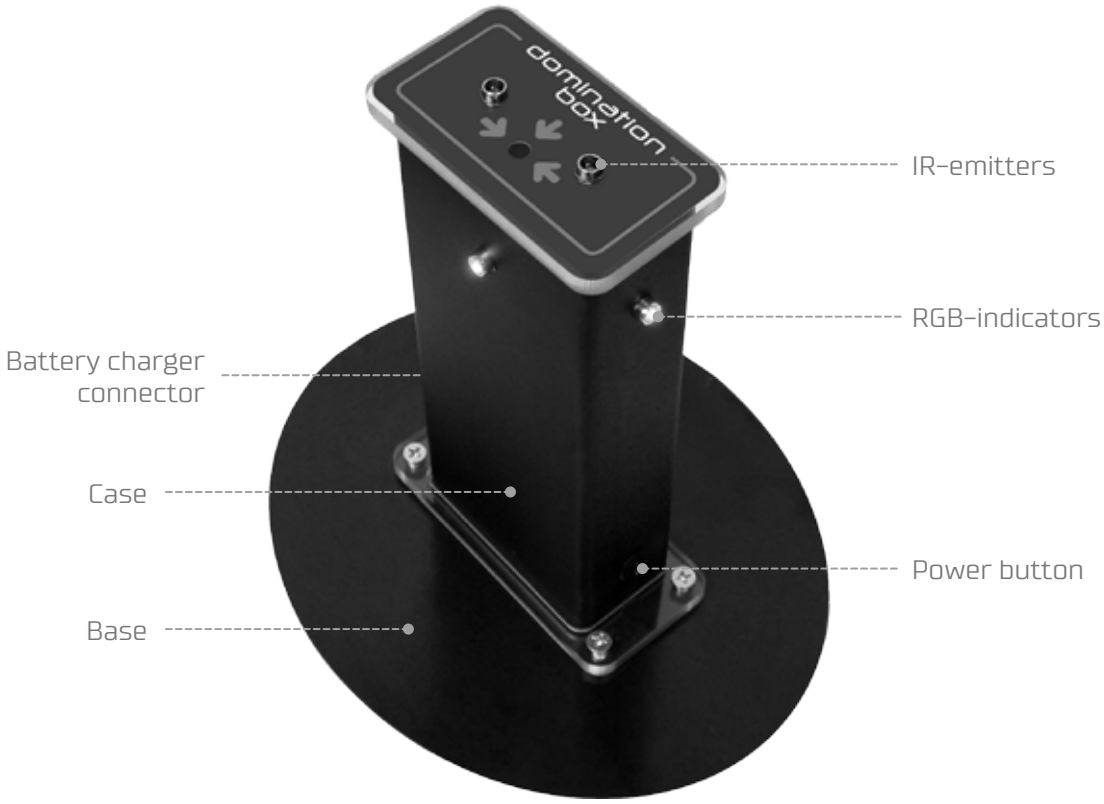
3. From the Wireless menu, go the to Basic Setting and set:

- SSID (access point name) – LASERTAG-NET;
- Encryption – WPA2-PSK;
- Encryp Type (encryption type) – AES;
- Key (password to the access point) – 2015LT2015;
- Apply the selected settings with the «Apply» button.



Then you should set the local network (chapter 14 of the given instruction).

4. Domination box



The Domination Box

The Domination Box is one of the key elements in many laser tag game scenarios, in particular, the "Domination Box capture" scenario – one of the most popular game scenarios.

The device consists of the base and the case as well as the RGB indicator LEDs, the power button and the charger socket, positioned on the exterior side of the case. The electronic board with the IR-receiver and the IR-emitter as well as the speaker and the battery are built into the case.

The Domination Box configuration

The Domination Box is designed to register its "capture" by players from different teams, to add up and keep record of total capture scores as well as to determine the winner.

The capture score (time) needed to win the round is programmed using a remote control.

To configure the Domination Box:

1. Switch the domination box on using the button  at the top of the case. The indicator LEDs will light up with white color. Then, turn on your remote control. To increase the capture time by one minute, direct the IR-emitter on the remote control vertically and towards the top of the Domination Box and press the "double life" button.

2. Take the remote control.

3. To increase the capture time by one minute, direct the IR-emitter on the remote control vertically and towards the top of the Domination Box and press the "double life" button. Each time this button on the remote control is pressed, the Domination Box will respond with short white flashes of the RGB-indicators, with the number of flashes corresponding to the number of minutes set for the box capture. One flash means – 2 minutes are set for the box capture, 2 flashes – 4 min, 3 flashes – 6 min, 4 flashes- 8 min, 5 – 10 min, 6-15 min, 7-20 min, 8-30 min, 9-40 min. The maximal time period – is 60 minutes, it is signalized by LEDs flashes. The capture time will cycle – i.e. After 60 minutes, the next pressing of the button will display 2 minutes.

Play mode

Upon power-on, the Domination Box will flash white light and replay sound announcement: "go-go-go".

In order to register the box capture, the tager's emitter must be aimed at the top of the case as vertically as possible, as if trying to shoot inside the device, because the IR-hit sensor is located at the bottom of the Domination Box. Such sensor positioning is meant to eliminate false capture triggering from long or stray shots.

Each time a player captures the box, the timer will stop counting time for the last box "holder" and start counting capture time for the new one, while the box will light up with one of the four colors corresponding to the color of the team, who takes over the box.

In addition to that, all players will receive a sound warning from their laser tag guns: "The Domination Box has been captured" (the sound may not be played, if a player is far from DB).

When the Domination Box is taken over by opponents, its indicators will change the color to that of the new box holder. The timer continuously sums up the time the point is held by a team and, if the time limit is reached, the domination box will signal the end of the round with a sound and a flashing of the RGB- indicators with the color of the winning team.

The Domination Box is reset by pressing the "New game" button on the remote control. The device will react in the same way as upon first power-on.

5. Sport Domination Box

Sport domination box is one of the Domination Box types. The main distinguishing thing of this DB is the presence of two capture buttons at the case top. That allows to use this device for both – laser tag and paintball as well.

The device consists of the base and the case as well as the RGB indicators, the power button, the charger socket and two capture buttons, positioned on the exterior side of the case. The electronic board with the IR-receiver and the IR-emitter as well as the speaker and the battery are built into the case.

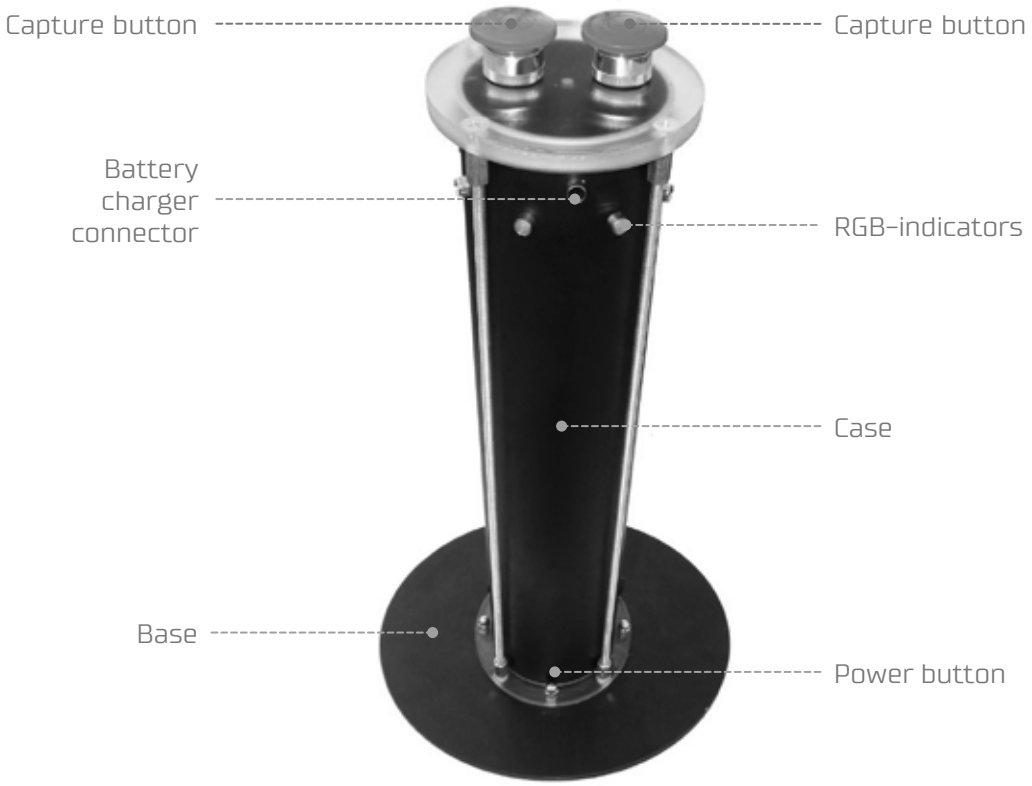
Service mode

The device can operate in 2 modes:

1. The capturing is made by buttons ("Paintball");

2. The capturing is made by tager's shooting ("Laser tag")

To select the operating mode of the device, you must turn it on while the red



DB Sport components

button is pressed. The button must be released, and the Domination Box reproduces the system sound, which will inform you about entering the service mode. In this mode, each press of the green button will change the operating mode of the Box: «Paintball» or

«Lasertag». The change will be supported by a sound signal, so you can determine the device mode.

To set the capture time, turn on the device while the green button is pressed. Release the button, you'll hear the system sound.

In this mode each press of the red button increases the capture time of the device (cyclically from 1 to 9 and again from 1 to 9). Each press of the green button cyclically decreases the capture time. The device will react with short signals; the number of signals matches the number of minutes set for the box capture.

The capture time in the service mode can be also set by the remote control the same way as setting the Domination Box.

After the setting the Domination Box should be switched off and then switched on again.

Play mode

Button capture mode

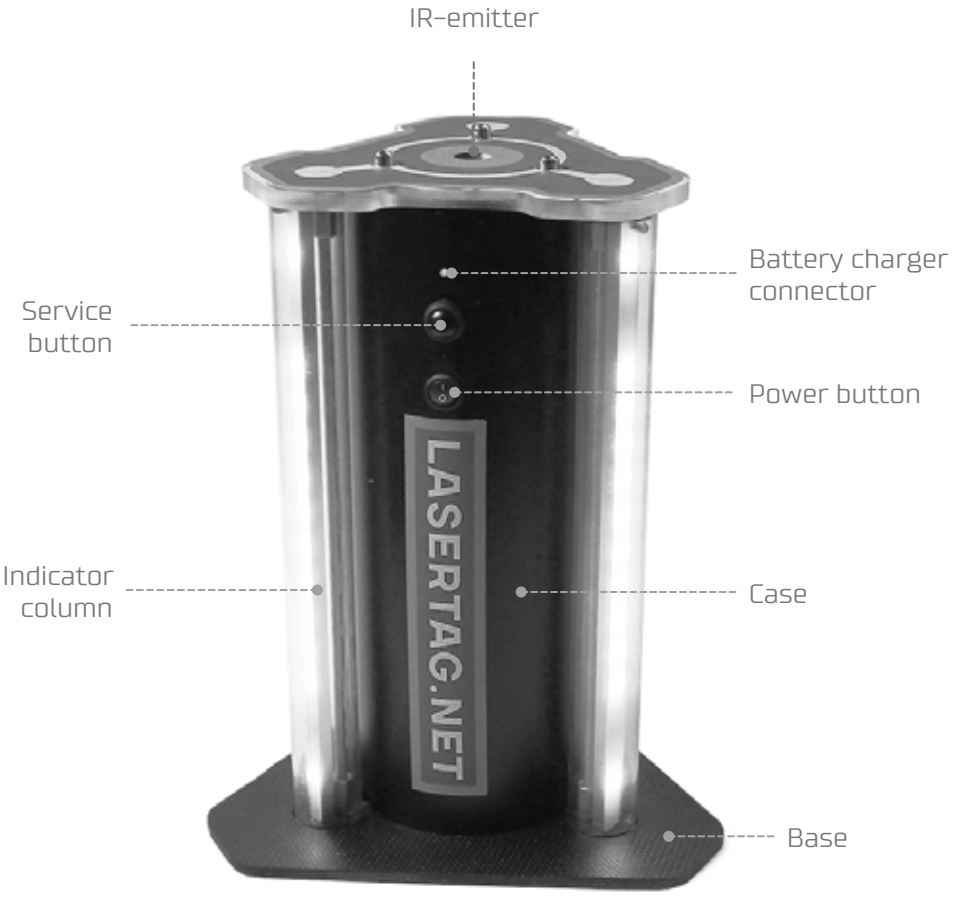
To capture the DB, you must press the power button on the device. After the capturing, the time is counted according to the type of chess clock. A team whose color has been switched on for longer and whose total capture period has reached the specified time period earlier, wins.

Tager capture mode

In this mode the device operates the same way as in usual Domination Box.

6. Smart Domination Box

The Smart Domination Box – it is an absolutely new development of the Domination Box. The main difference from a standard Domination box is the presence of 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.



Smart Domination Box

The device consists of the base and the case, on the exterior side of which there are three columns with 16 smart RGB indicators on each. There are the battery charger connector, the power button and the service button, positioned on the exterior side of the case. Three IR-emitters are placed at the top and three more are mounted at the top part of the case. Inside of the case the electronic card with IR-port, speaker and batteries are placed.

The default function of the device is still to register the capture by players of different teams, sum up the total time the team was in control or the number of shots it made and to choose the winner.

The Domination Box Smart has 4 modes – standby, configurations, 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%, 9 – 50%, etc.

Configuration mode

To select the configuration mode you should press and hold the service button for 2–3 sec.

In this mode, the extreme LEDs of the indicator columns will glow with a color of current mode, and the 10 middle LEDs will show its current settings (capture time or number of shots).

To select the indication mode – direct remote control emitter to the DB receiver located at the bottom of the device. Pressing the «Power» button you will cycle the mode. That will be indicated by the color change and the number of glowing LEDs on the Domination Box indicator columns. By pressing the «Life x2» button, the modes are reversed.

There are 5 indication modes:


– "Capture by time"
(white LEDs color);


– "Capture by shots"
(yellow LEDs color);


– "Tug-of-war"
(by time/red LEDs color);


– "Triple capture"
(by time/green LEDs color);


– "Raise the flag"
(by shots/blue LEDs color).

The indication mode configurations.

For each mode, you can set either the number of shots, or the capture time of the DBs needed to determine the winner of the round.

In the **capture by time mode**, the one LED flash corresponds to 1 minute, 2 LEDs – 2 minutes, 3 – 3 minutes, 4 – 4 minutes, 5 – 5 minutes, 6 – 7 minutes, 7 – 10 minutes, 8 – 15 minutes, 9 – 20 minutes, 10 – 30 minutes.

In the **capture by shots mode**, the one LED flash corresponds to 50 shots, 2 LEDs – 100 shots, 3 – 150, 4 – 200, 5 – 250, 6 – 300, 7 – 350, 8 – 400, 9 – 450, 10 – 500.

To change the mode configurations, direct the emitter of the remote control to the DB receiver. Press the «Delete» button to set the parameter.

To exit the settings mode, you must turn the device off and on again. The glow of the two central LEDs with the color of the current mode will inform you about the switching to the standby mode.

Play mode

To switch to the play mode, you need to direct the emitter of the remote control to the DB receiver and press the «New Game» button. After that, only the uppermost LEDs glow with neutral white color (to make it easier to find the device at the start), and the speaker will give the command «go, go, go!».

Capture by time mode

This mode allows simultaneous participation of 2–4 teams.

It is a classic mode. At the first hit of the Domination Box sensor, the lower LEDs of

the indicator scale will change color to that of the team which player has hit it

and the timer will start counting the time it remains under this team's control. If the other team hasn't taken the Domination Box over, the LEDs will show the capture level by gradual filling the scale with its color upwards.

The flash of each LED corresponds to 1/16 of the capture time.

When the Domination Box is captured by another team, it will again change color to that of the new team, and, having stored the time score for the first team, it will start a new time count for the second team and the LEDs show the level of its capture by the corresponding color. The timer isn't reset; it restarts its work after this team captures the Domination box again.

The team, whose total time in control of the DB reaches the specified time, becomes the winner. When a team holds control of the DB for the required period of time, it will flash in the winner's color and produce a sound to signal the end of the battle.

To **restart** the game round with previous setting, direct the remote control emitter to the DB receiver and press the "New game" button.

Capture by shots mode

This mode allows simultaneous participation of 2–4 teams.

The main difference from the previous mode is that capturing is made not by the time, but by the number of hits in the DB receiver. Another feature of this mode is the radiation mode set by default. This feature prevents players from gathering around the DB and thus provides equal conditions of the game. In this case, every 5 seconds, players who in close proximity to the device IR emitters will lose a health unit.

At the first hit, the lower LEDs of all the columns are lit with the color of the player's team. At the further hits, the LEDs will gradually fill up the scale upwards according to the capture number. For example, if 100 hits are set in the configuration mode, the flash of each LED will correspond to 100/16 = 6 hits.

If the players of the other teams hit the DB receiver the LEDs will show the capture level of these teams with the corresponding color. The achieved level of the teams is not reset. When a team reaches a specified number of hits, the Domination Box plays an audio signal and starts flashing the color of the winning team.

"Tug-of-war" mode

Two teams can participate in one game.

In this mode the aim is to capture the Domination Box by time. The main difference is that three indication zones are filled with two colors at the same time during the entire game. They indicate the real time capture level of each team.

When the Domination Box is captured by the first team, its timer is turned on and the bottom 8 LEDs are lit with the color of the team.

In this case, they will pulsate and until the Domination Box is captured by another team, the glow gradually rises.

The second team lights the top part of the scale by a hit and its color indicators will «shift down» the LEDs of the other team. The flash of each LED corresponds to 1/16 of the set capture time.

When all the LEDs light up in the same color, the Domination Box plays an audio signal and starts flashing the color of the winning team.

Triple capture mode

This mode allows simultaneous participation of 2–3 teams. The aim is to capture the Domination Box by time. The distinguishing thing of this mode is that the level of capture is displayed independently for each team in different indication scales in the real time mode.

After the first hit, the timer of the winning team is turned on and the lower LEDs of one indicator scale starts flashing gradually with the color of this team.

As the timer works, the LEDs will light up, each LED will correspond to 1/16 of the set capture time. If the players of the other team hit the DB receiver the LEDs of the second indicating scale light up and flash gradually.

The timer of the previous team stops, but does not reset, and restarts its work when this team captures the Domination Box again.

LEDs stop blinking and remain on at the current level. The same thing happens when the third team hits. The Domination Box doesn't react on the fourth team.

When all LEDs of one indication scale are lit up, the Domination Box makes a special sound and starts flashing with the winning team color.

You can use this mode for both teams as well, but in this case set the Domination Box so that you can see the scales of the participating teams, for example, near the wall.

Rise the flag mode

Two teams can participate in one game. In this mode the aim is to capture the Domination Box by shots. And the indication of the capture level is shown on all indicating scales on the principle of «raising the flag.»

After the first shot, the lower LED lights up in the color of the player's team. When the number of shots equal to 1/16 of the set capture parameter is reached, the LEDs light up gradually. If the second team takes the Domination Box over, the LEDs of the previous team turn off gradually, and then light up with the color of the new winning team.

Like in the «Capture by time» mode, during the game, the infrared emitters of the device give out the «Radiation» command every 5 seconds, players who in close proximity to the device IR emitters will lose a health unit.

The team that first raises the flag / LED scale of its color wins. The Domination Box plays an audio signal and starts flashing the color of the winning team.

Service mode

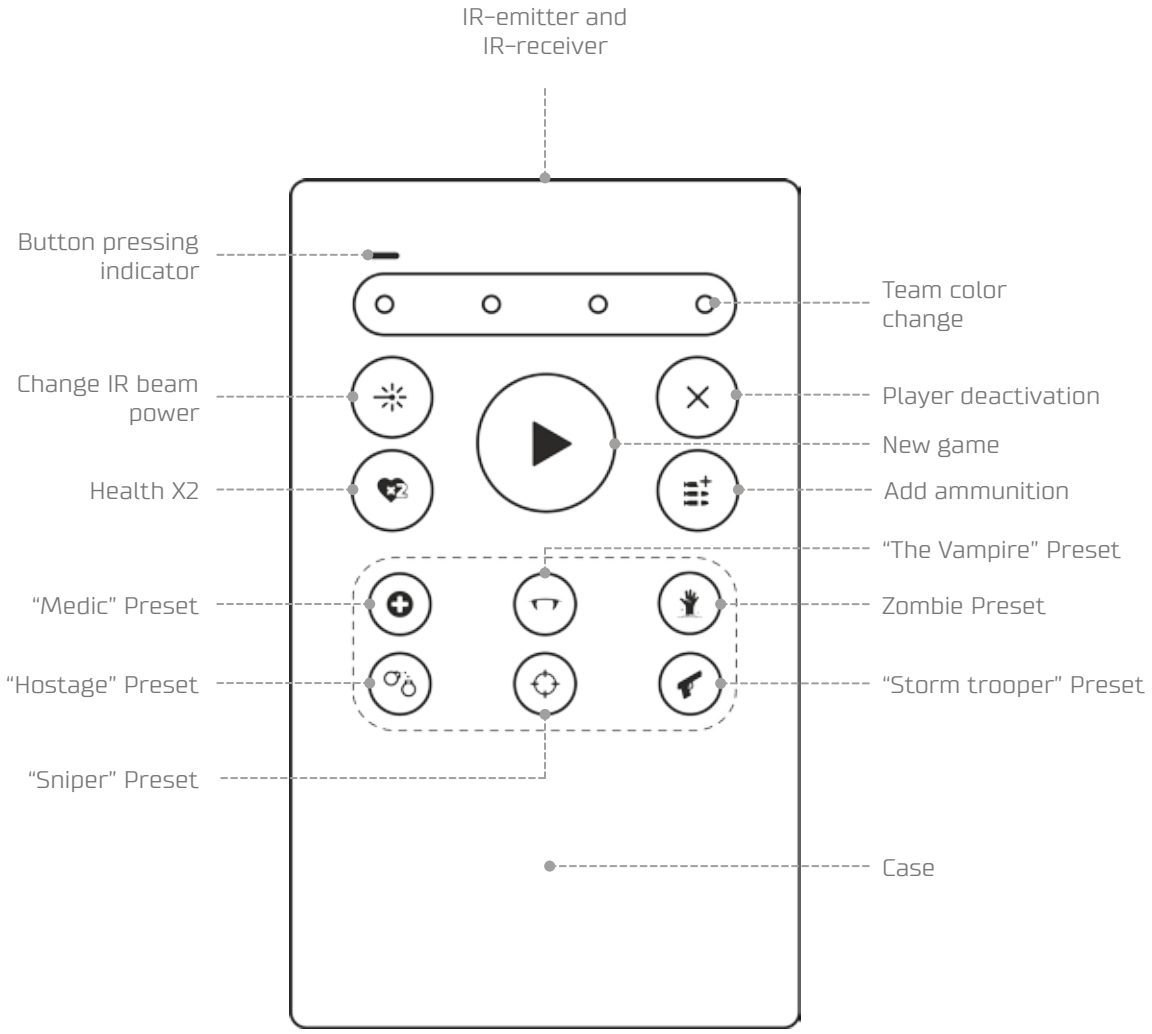
The Domination Box control card is equipped with a Wi-Fi module. Due to this, it is possible to re-firmware the device microcontroller «by air».

You have to do it when the firmware is updated (it is planned to increase the mode number of the Domination Box up to 10 at least), and also to restore the current firmware version.

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

Switching to the service mode is carried out by turning on the device by pressing the service button. The power indicator flashing will signalize about the switching to this mode. The procedure of the Domination Box re-firmware is the same as for game kits (Section 15 of this manual, paragraphs 8–12).

7. Remote control



Remote control Smart – external elements

The remote control (RC) is designed to configure tager parameters, set extra devices and control the game process. The remote control is powered by 2 batteries of 1, 5 V type AAA.

On the external panel of the remote control there are 15 buttons, graphically divided into 3 zones: teams color change, game control and presets (kits settings by scenario). The front side panel of the remote control is made of transparent material for IR-emitting, that allows to send and receive game commands.

Game kit settings configuration

To change game kit settings, the tager–headband playset must be within direct line of sight, preferably, at a distance within 5 m. or closer.

1. Switch on the tager and the headband in statdby mode. If the game kit is connected, the headband will blink in the preset team color and the tager speaker will replay the alert message: "Check your weapons and get ready".

2. Direct the IR emitter of the remote control at any of the hit sensors and indicator units on the headband.

3. Press the "Power" button to adjust the power of the beam emitted by the tager IR LED. This setting should be adjusted depending on the game environment. Also, increase the beam power for games played in open grounds, or under sunny weather and turn it down during games played in the evening or indoors to reduce ricochet effect. This remote control setting has 2 power presets – maximal and minimal – toggled whenever the button is pressed. When toggled to full power – 90, the tager speaker will produce a shot sound characteristic of the weapon involved and a silenced shot sound when toggled to reduced beam power – 40. Pressing this button will also toggle shot range and light brightness of the optical LED. The IR beam power setting with an accuracy of 1% can be made with the help of installed computer program.

4. Pressing "health x2" the number of hits required to kill the player in the current game round increases. Upon doing so, the tager will replay sound signals resembling the Morse code, with their number corresponding to that of health points. This setting can be set for a maximum of 255 hits.

5. The team color is changed using 4 buttons of "Team color". Each pressing of the button will cycle the color of the headband RGB indicators light, accompanied by a sound signal from the tager speaker.

6. You can add ammunition by pressing the corresponding button on the remote control. The «clip» of the tager is filled, i.e. if there were 29 cartridges in clip, then only 1 cartridge will be added (at the settings of 30 cartridges in the clip).

7. The presence of 6 presets buttons allows you to change the kits' settings depending on the scenario. Each preset is a set of configurations, allowing you to enable the kit with certain abilities. (This function is under development).

He shot power, health points and team color settings can also be changed in the game round.

Play mode

After the whole playset has been configured, pressing the "New game" button start a new round. For this purpose, direct the IR emitter of the remote control at the sensors on players' headbands (within direct line of sight and not more than 5 meters away) and press this button. The headband will respond with a short flash in the team color and will go off, while the tager speakers will replay the sound command "Go-go-go!".

The teams go to their bases to wait for the go-ahead signal.

By using the remote control, the referee can also remove a player from the game in case, for example, he or she does not play by the rules. In order to do so, direct the remote control at this player's headband and press "Remove" button. The response of the tager and the headband will be the same as if the player was hit with his or her last health point left.

The referee can respawn a player without the need for his or her return to the base.

By default, the remote control is already programmed with necessary commands, but any button can be reprogrammed to suit your own desires and game needs.

Assigning commands to the buttons

To do this you will need a similar remote control, which commands can be copied.

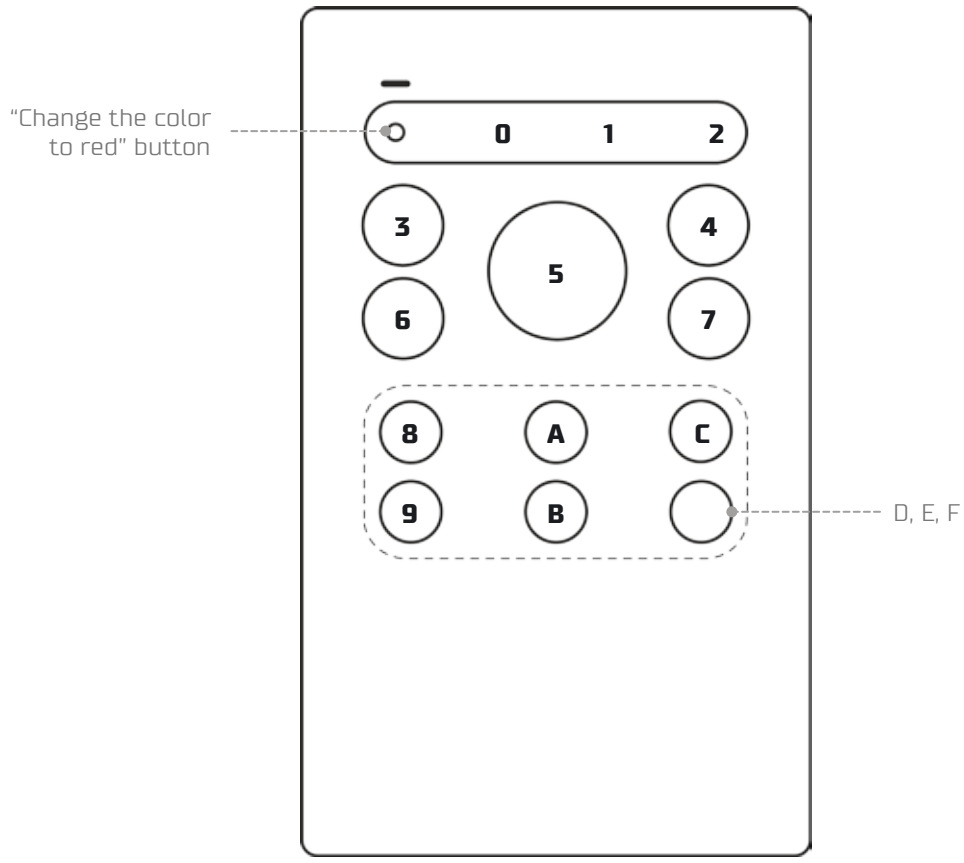
The procedure is as follows:

1. Direct the front semitransparent panel of the remote control to the radiator of copied remote control.
2. Press the re-programmable button of the remote control until the LED flashes rapidly.
3. Press the needed button on the remote control that is copied.
4. As a confirmation of the button function changing you'll see the increased flashing frequency of the LED (in 1 s.).
5. Release the reprogrammed button on the remote control.
6. Check the correctness of the changing.
7. If necessary, repeat the procedure for the other buttons.

Moreover, the new remote control is able to self-develop. Using the buttons as a keyboard, you can program each them without additional devices.

Instructions for remote control Smart self-programming

1. Press the «Change color to red» button and the button you want to reprogram.
2. Wait until the green LED stops flashing (there should be a steady light).
3. While holding the button «Change color to red» release the button that is programming.
4. Without releasing the «Change color for red» button, dial 4-digit code, according to the code table and the attached symbols and button matching scheme. To enter the «E» character, you must press the « Storm trooper» button 2 times, to enter «F» – 3 times. "Change the color to red" button.The remote control symbols and buttons matching scheme.



The remote control symbols and buttons matching scheme

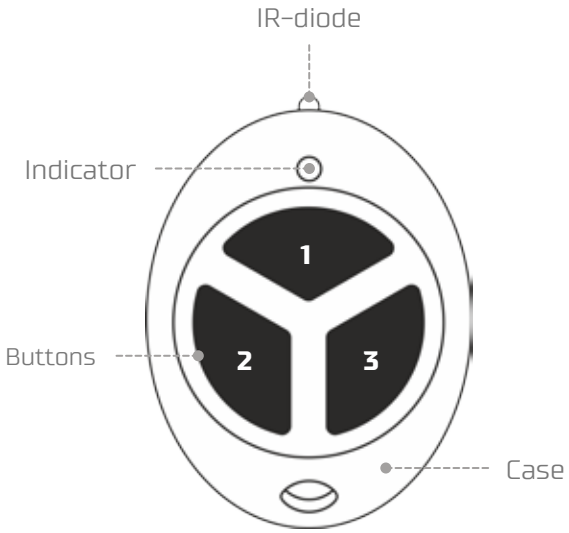
5. As a confirmation of successful code entry you'll see a green LED light.

Entering codes:

Command	Code
The Domination Box is captured	8311
Player deactivation	8300
Add 1 health unit	8B01
Radiation	A001
New game	8305
IR-power changing	830E
Life X2	8310
Change the team's color	8309
Change the team's color to red	A900
Change the team's color to blue	A901
Change the team's color to yellow	A902
Change the team's color to green	A903
Respawn	8304
Fill the clip up to 30 cartridges	811E
"Vampire" preset	A807
"Medic" preset	A806
"Sniper" preset	A805
"Special" preset	A804
"Zombie" preset	A803
"Last Hero" preset	A802
"Hostage" preset	A801
"Storm trooper" preset	A800
Radiation for red only	BE01
Radiation for blue only	BF01
Radiation for yellow only	C001
Radiation for green only	C101

To get back to the default settings – press two bottom buttons («Hostage» and «Storm trooper») and wait (about 5 seconds) until the green LED stops flashing – this action restores the factory settings.

8. Remote control Smart mini



The remote control appearance and the numbering of the buttons

Remote control Smart Mini is a simplified three buttons version of the usual remote control.

By default, the buttons are programmed for the following commands: №1 – New

Game, №2 – Change Team color, №3 – Add lives. Power source – CR 2032 battery.

It's quite easy to use the remote control mini – direct it at the selected player's sensors and press the needed button. The green LED indicator should light up. The working range is 3–5 meters.

Like the remote control, the remote control Smart Mini is self-developing, it means that you may assign any command to each button.

It gives you a wide range of opportunities for creating an optimal device for the instructor, and for using this device in scenario games.

To assign the commands to the buttons – use the standard remote control, the radio base and Lasertag_PC program (see chapter 7 of the given instruction).

The case of the device is partially transparent for the IR-emitters, that allows you to program the buttons without case dissembling. The IR-receiver is located on the backside of the remote control.

Buttons programming using the remote control:

1. Turn on the remote control.
2. Switch the assigned button of the remote control to the programming mode:Press the button for 5 seconds and wait until the steady flash will be changed to intermittent one.
3. Hold the pressed button and direct the IR-emitter of the remote control to the backside of the case and press any chosen button or the combination of buttons (with Shift key). The assignment of a new command will be signaled by changing the blinking mode of the indicator (1 time in 1 s).
4. After releasing the button, at the next press the button will perform a new command.

9. Utility Box

External elements of the Utility Box

The Utility Box (UB) is an indispensable attribute of many laser tag gaming scenarios. The device by Lasertag.net can operate in 4 modes: “Respawn”, “Radiation”, “Medkit”, and “Random”.

When active, the Universal Box sends a pulse at regular intervals, called time steps, which adds or decreases health points (“lives”) of the players within its reach (with a line of sight range of 5–7 meters).

The outside surface of the device is equipped with 5 infrared emitters to completely cover the playground, the power button, and the battery charging socket. The UB top panel has three LED mode indicators.

Beside the battery, an electronic card with IR-receiver and a speaker are placed on the case.

UTILITY BOX CONFIGURING

The mode of the Utility Box is set with the remote control.

To change the mode:

1. Turn on both the UB and the remote control using their power buttons  . Upon power-on, the UB lights up one of its LEDs and the speaker produces a series of short beep sounds, preset for the mode selected the last time.
2. The remote control itself should be pointed as if “into” the Utility Box.
3. Press the “New game” button on the remote control. Each button press cycles through the Utility Box modes: “Medkit”, “Radiation”, “Respawn”, “Random”.

For example, on first power-on, the green LED lights up and three following signals indicate the “Medkit” mode with time step of 30 seconds (the icon will show you the current mode).

Each pulse generated by the device in the preset time step adds one health point to all players nearby. The gun’s speaker reports: “MEDKIT”, while the headband RGB indicators respond with a flash of light in the team’s color.

If the LED lights up in blue, the Utility Box is in the «Radiation» mode.

In this mode, the device emits a pulse in a preset time step causing 1 point damage to the health of all the players within the “exposure” area. All affected players will hear a sound from the rifle’s speaker similar to the noise of the Geiger counter, while the rest of the gear reacts in the same way as when hit by the opponent’s gun shot.

When the red LED lights up – it means UB in the Respawn mode. This device configuration replenishes health of all players within its reach. It is recommended to place the Utility Box set for “Respawn” behind a bunker, so it is positioned out of the direct line-of-sight of players in the field.

When a player replenishes his health, the headband stops blinking and the speaker plays the message: “GO-GO-GO!”.

To get the signal from the Utility Box the hit sensor of the player’s headband must be within the radius of its action.

The last Utility Box mode is the “Random” one. When selecting this mode, one will see the white LED and the matching icon.

When in this mode, the Utility Box will randomly switch into the “Respawn”, “Radiation” or “Medkit” modes.

The time step for the pulse generated by the Utility Box is configured using the remote control too. Each pressing of the “double life” button will increase the step by 10 seconds. The maximum time between the pulses is 90 seconds, and then again 10 seconds and so on.

10. Battery charger

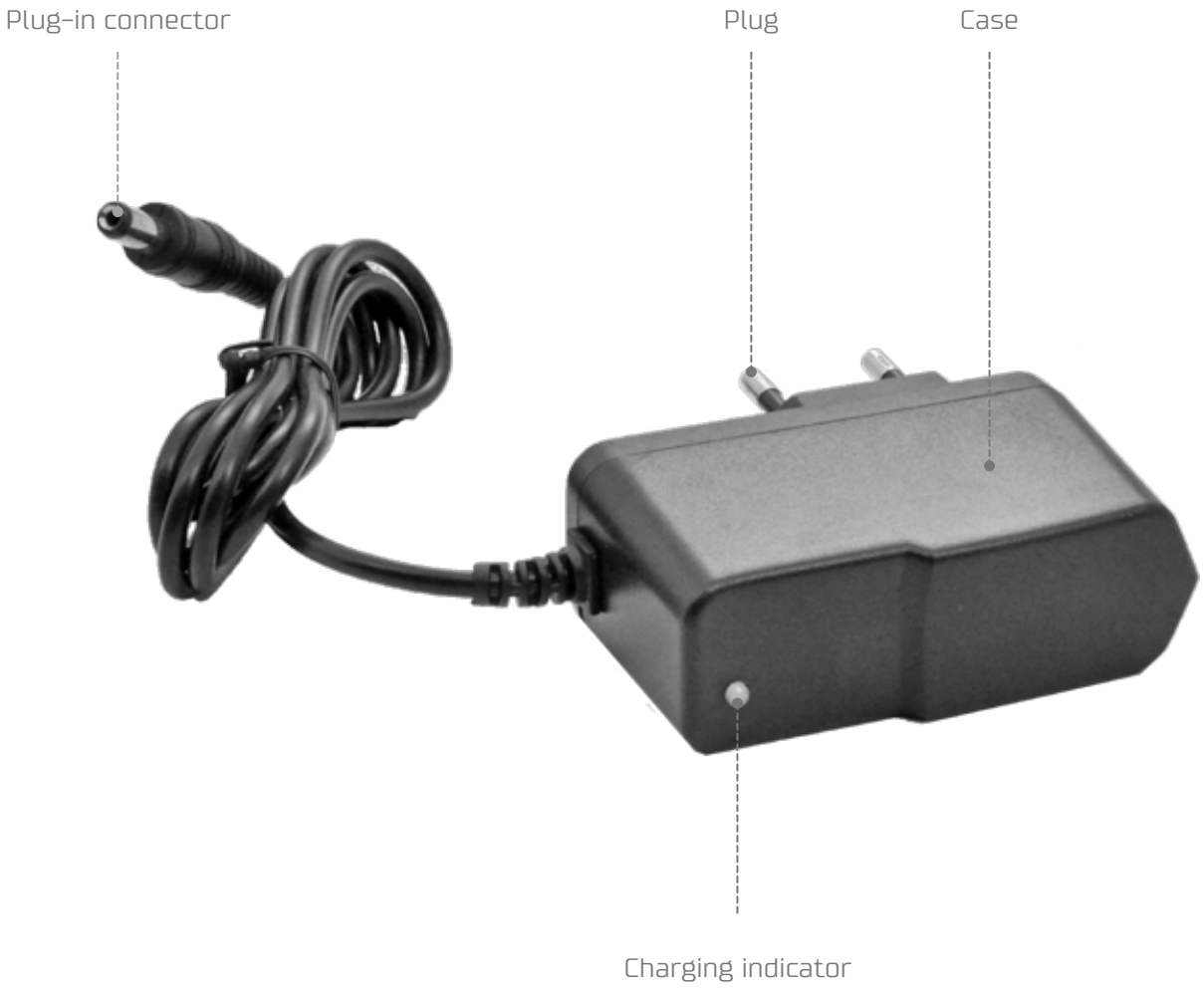
The Battery charger is designed for charging the built-in batteries of lasertag-equipment.

The main feature of this device is that when the full charge of the battery is reached, the amperage automatically decreases and the LED's color changes from red to green.

In the equipment supplied by the Lasertag.net company, lithium-ion batteries rated at 7.4V are used. The cycle of charging fully discharged battery for a headband (capacity 750 mA / h) – is 3 hours, for a tager (capacity 2260 mA / h) – is 5-6 hours.

ATTENTION!

Do not leave the charging set for the night without attention!



Battery charger

11. Electronic target

The electronic target is developed for adjustment fire of tagers. The shooting range can be used within the game scenario and as an independent entertainment as well.

On the electronic target case a power button, charger connector, IR receiver and four RGB-indicators of hit are placed.

The power – built-in Li-ion battery (7.4 V).

To use the device – set it to the required distance (for adjusting the tagers 60-80 m) and press the power button  . The LED will glow with white color it means that electronic target is ready for operation. On each hit the shooting range responds by a 2-second flash of the color of winning team and the sound signal of the piezoelectric element, after that the LED again flashes white glow.

As a target for the adjusting fire a tager-headband kit can be used:

1. Switch on the remote control and both kits in Standby mode.
2. Press the button 4 on the remote control and set both kits on different colors.
3. Give 128 health units to the target-kit (press the "Life X2" button of the remote control 7 times).
4. Start game with the "New game" button.
5. Place the target-kit on a stable surface and direct one of the sensors on the shooter.
6. Move away with the calibrated tager to a distance of 60-80 m, aim at the mark of the red dot sight and fire 2-3 shots on the headband-target.
7. If the target wasn't reached – fire lower, higher, on sides. Remove the protective caps of the adjusting screws and adjust them until the accurate hit.

Electronic target

12. Bomb–light

The main feature of the bomb –its ease use. Even children of age under 8 can easily manage with the bomb–light. It is successfully used in combination with other devices for both – dynamic and complex tactical scenarios as well.

Bomba setting

The bomb is activated by pressing the power button on the case side panel. The activated bomb is in Standby mode.

The explosion hold time is set with the Remote Control (time step – is 20 sec).

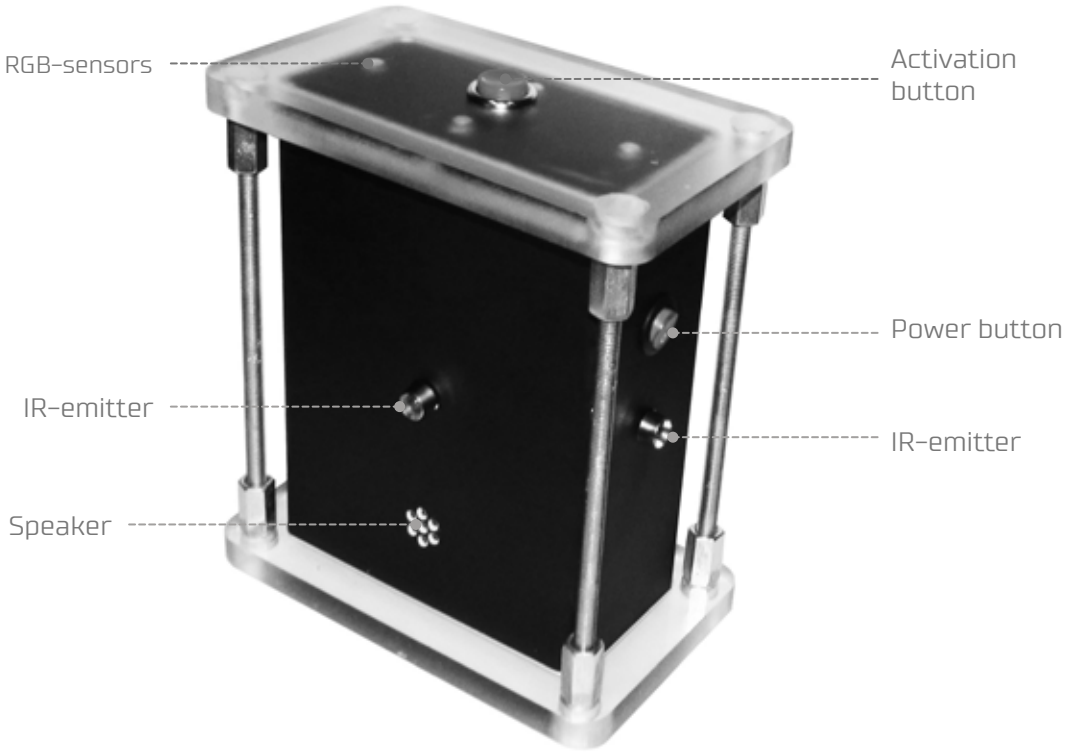
Each pressing the «Life x2» button increases the interval by 20 seconds (minimum 20 seconds, maximum 200 seconds). To decrease the countdown time, press button 4 «team color» (for remote control of the old sample).

Game mode

It is necessary to press the button placed at the top part of bomb and hold it within 10 seconds to activate the bomb. At this moment

the RGB diodes located under the upper, transparent panel of the bomb change their glow color from green to red. When the diodes are red – the bomb is activated.

After the bomb activation, you'll hear an alarm sound, the frequency of which increases by the time of the explosion. After the countdown, the bomb «explodes». At the same time, you'll hear the sound and the players in the radius of 10 meters will be hit by infrared emitters. To deactivate the bomb, the player has to press the activation button for 10 seconds. In this case, the diodes change their color from red to green. When the diodes glowed green – the bomb is deactivated (neutralized).



Bomb–light

13. Tripwire-mine

Tripwire mine is suitable for many scenarios and can be used both in

indoors, and outside. It is recommended to place the tripwire mine: at the entrance / exit of the building, in doorways, at corners, behind bunkers, bushes, trees.

There is a power button, a charger connector, a speaker, 2 ultrasonic motion sensors, an IR receiver (impact sensor), 5 IR emitters (on each side except the rear) and an RGB indicator on the tripwire mine case. Power – built-in Li-ion battery (7.4 V).

Tripwire-mine

Game mode

The tripwire-mine is installed by turning on the power button. After that, within 5-6 seconds (so that the player who installed the mine could move away from it), the mine switches into active mode. The switching is accompanied by an intermittent sound signal from the speaker on the side panel and a gradual color change of the RGB LED from red to green. When the diode goes out, and the audio signal is silenced, the mine is activated.

ATTENTION!

At the moment of switching to the active mode, there should be no players or objects in the tripwire-mine control zone, in this case the control zone of the mine is either reduced or the device is not activated: the sound signal does not stop, the cycles of the LED flashing are repeated.

In the active mode, the ultrasonic motion detector controls a zone with a radius of 4 meters with a capture angle of about 15°.

After the player of any team crosses the control zone, the device reproduces the sound of the explosion and emits 10 infrared signals within 3 seconds to «kill» all players within a radius of 10 meters.

After that, the tripwire-mine switches

into the standby mode for 5 minutes. In this mode, the RGB LED gradually flashes and fades in blue color. The timer of the standby mode is stored in the controller memory, it means if you turn off and turn on the tripwire-mine within the stand-by mode, it will not switch into the active mode.

After 5 minutes of standby mode, a short signal is played and the LED starts blinking red, that shows that the tripwire is ready for the new installation. Installation is performed by turning the power off and on.

In order not to wait for 5 minutes, the administrator can shorten the waiting time using the remote control. To do this, you have to send the IR emitter of the remote control to the front panel of the tripwire mine and press the «New Game» button – the waiting timer will reset. The LED will gradually flash in red, and to set the alarm, turn off the device and turn it on again.

Tripwire-mine clearing

On the front panel of the mine there is a hit sensor, it allows to deactivate it with sharp shots from the tager.

The number of shots for mine clearing depends on the damage level of one shot set on the tager (to check the damage level use the radio base and Lasertag_PC program:

«Management» / «Settings / commands» / «Read configurations». If the weapons damage is less than 10 the player has to hit the hit sensor for 16 times. If the damage level is from 10 to 30 – 8 times, if the damage level is more than 30 – 4 times.

The period between the shots mustn't be exceed 2 seconds. If for example after the 5th shot more than 2 seconds pass, the counter resets and the procedure of mine clearing must be done from the very beginning.

Completion of clearance is accompanied by a short beep, a light-emitting diode switches on and starts blinking with blue color – the tripwire switches from the active to the standby mode. To reactivate the mine, you either need to wait 5 minutes, or use the Remote Control (press the «New Game» button).

Summary table of RGB-LED and tripwire-mine indication:

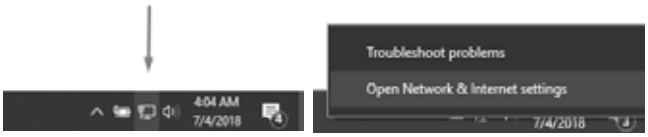
Glow color	Mode	Action
Gradual color changing from red to green	Mine activation	Switching to the active mode in 5 seconds
Flowing blue blinking	Standby	Wait 5 minutes or turn off the mode with the remote control
Flowing red blinking	Readiness	To activate the mine, turn the device on and off
The light is off	Active/mine is deactivated	When the player crosses the control zone, the mine «explodes» / Turn on the device

14. Local network configuration

You should set up the local net on the host computer for configuration, control and getting the statistics with the help of computer programs and wi-fi router:

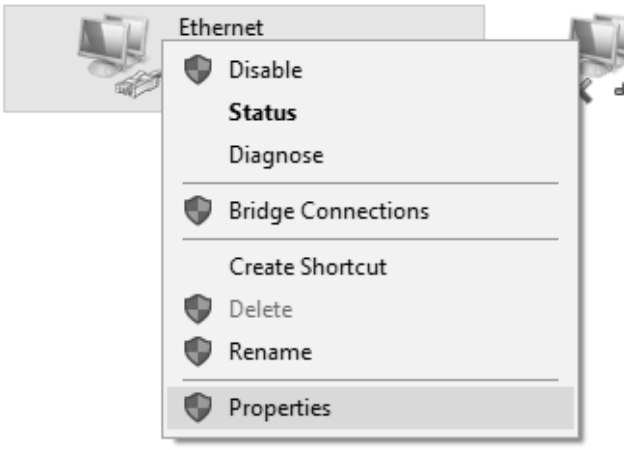
1. Using one of the 4 LAN-correctors plug in the router to the computer's network card with the help of UTP cable, that is included to the kit.
2. Turn on the router (Router configurations are described in the chapter 3 of the given instruction).
3. Local network configuration for Windows 7:

• In the Toolbar, click the left mouse button on the network status icon and on the inscription: «Center for Network and Community Management Access».



• In the window that appears, click on «Change adapter settings».

• Move the cursor to the «Local Area Connection» icon and press the right mouse button.



• Click on the «Properties» button.

• Select the line «Internet Protocol version 4» and click the «Properties» button.

• In the «Properties: Internet Protocol Version 4 (TCP / IPv4)» window, set options:

IP address:
192.168.0.101

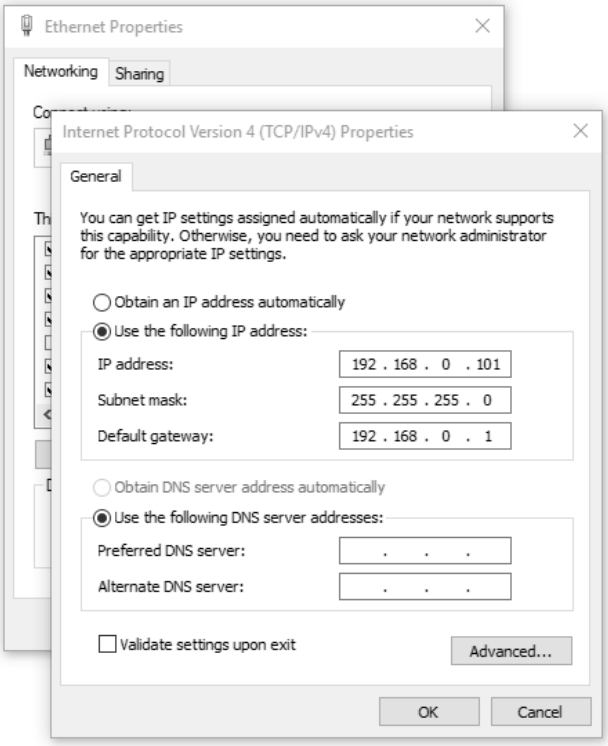
The subnet mask must be defined by itself:
255.255.255.0

Default Gateway:
192.168.0.1

Leave the remaining boxes empty.

• After all the parameters have been entered, click «OK» in the Protocol Properties and «Close» in the Connection Properties to save the settings.

• It is better to reboot the computer



The next step of equipment arena laser tag setting is the software installing – see Section 8 of this manual.

15. Re-firmware of game kits micro-controllers

When new firmware versions of laser tag equipment microcontrollers are released, the company has to update them. To update the firmware of the game kit you should switch it on in the boot-mode.

The mode is activated by pressing the power button of the tager. At the same time, you should also press the reloading button and pull the trigger simultaneously. The following measure sequence is recommended:

1. Save the firmware files of tager, screen and headband at any "*.ltz" directory.
2. Run the local network (see the chapter 14 of the given instruction) and BootLoader program (you may need to add the program to the list of exceptions for antivirus programs and firewalls). To connect the device to the program, the computer with running program must be at the same net where all devices are.
3. Place the tager and the headband at the close distance of each other, the IR-emitter of the tager must be directed to the IR-receiver of the headband control box.

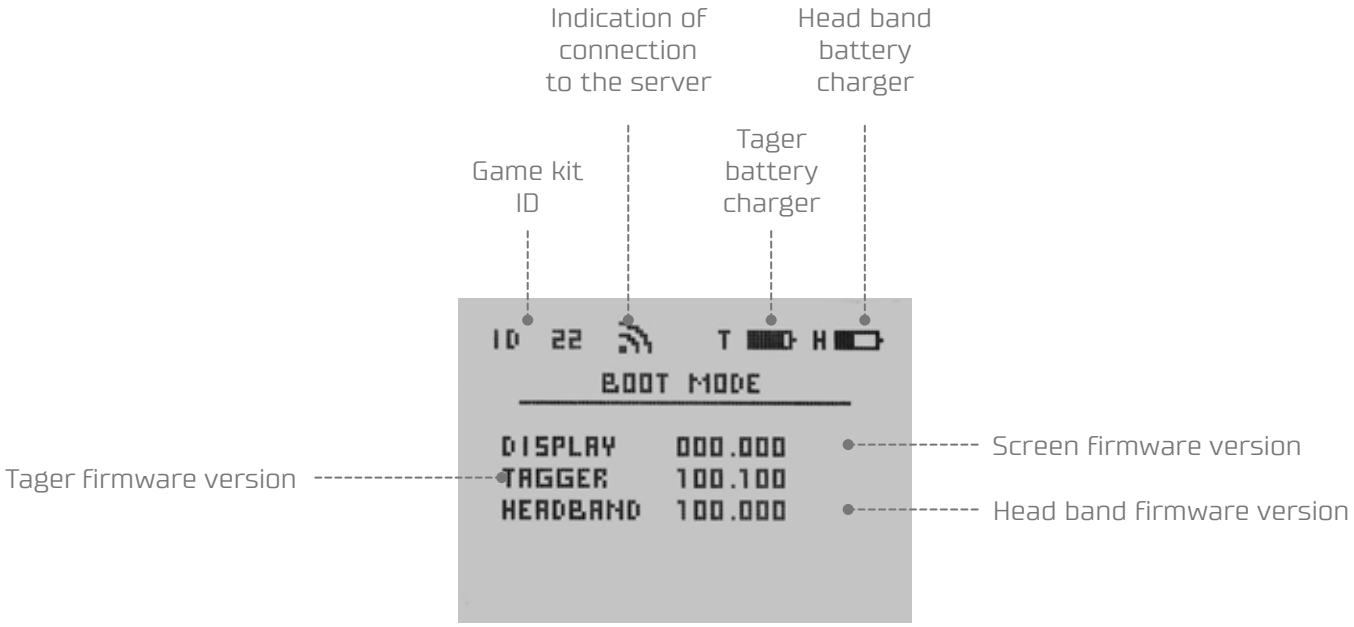
Location of the gaming kit for firmware updates

4. Switch the headband on.
5. Switch on the tager in a boot mode. (Pull the trigger with the index finger of the right hand, and with the index finger or the ring finger of the left hand press the reload button, and then with the thumb of the same hand press and hold the power button for 3-4 seconds).
6. With the correct position of the tager and the headband (initialization is carried out through the infrared channel), the headband should also be switched on in the boot-mode.

   The flashing of the headband indicators with different brightness will show the mode switching.

7. If the tager is equipped with the screen, you'll see the boot-menu on it:

8. Wait until the set is connected to the server, as a notification you'll see the certain icon at the upper part of the screen and the set's ID-number at the tab page of the BootLoader program. At the table of the tab page you'll see the connected sets IDs and also the available headbands and display controllers that are firmed. The missing components are marked by "-" sign.



LCD-screen in boot-mode

BootLoader screen

9. Using the file/open (or the combination of Ctrl+O keys) select the firmware files at the computer hard drive. Pressing the Shift button, you can select few files at once. Click the "Open" button.

10. The program automatically determines to which type of device and component the selected firmware belong. To deselect a file–click the cross–button next to its name. If the file belonging to the device is not determined by the program or the file is corrupted, an error message will be displayed.

11. If the correct firmware was selected, the «Start» button becomes active. By pressing the Start button the microcontroller firmware starts. First the progress bars show the level of firmware loading into the memory of the connected sets tagers, and then after their downloading – the firmware process. It should be noted that the headband is firmed via the IR channel (the emitter is an infrared diode of the tager), so the speed of its firmware is much lower. The firmware can be stopped by clicking on the «Stop» button. Meanwhile, you can see the progress of the firmware on the tager's screen – the first three numbers next to the name of the firmware show the percentage of its loading into the memory of the tag, the second three – the percentage of the controller firmware. And the indications on the screen in some situations (for example, when the connection with the server is broken) are more objective.

12. After completing the firmware, the sets must be reloaded.

16. Safety measures

The laser tag equipment set elements supplied by Lasertag.net are complex devices that require careful and proper handling.

Avoid moisture ingress the devices. If it happened, switch off the equipment and dry it for 4–5 hours at room temperature.

Take good care of the optical elements of the kit (the red dot sight, the lens of the tube) – prevent the mechanical damage and contamination. If contaminated, wipe with a damp cloth.

Protect the plastic cases from excessive mechanical stress. If the equipment was at a temperature below freezing – and is used in heated rooms, to avoid damage of the electronic components because of condensation, the equipment should be kept warm for at least 2 hours before switching on.

During the cold season it is recommended to wear the headband over the headdress. In a hot season – use a hygiene cuff, which should be replaced and sanitized after each game.

ATTENTION!

Do not use tagers, especially the ones, which imitate real military weapons, for games outside the laser tag area – the reaction of passers–by and law enforcement can lead to irreparable consequences!

Using the equipment with the built–in battery you should follow the safety measures for using the lithium–ion batteries.

Lithium–ion batteries used in our equipment have a number of advantages over traditional batteries. They are light, have long service life and a large specific capacity per unit of mass and volume. Batteries during storage and operation do not pollute the environment, they meet all world environmental standards.

However, lithium-ion batteries have the disadvantages as well. One of the most important disadvantage is the sensitivity to recharging and discharging. Recharging is usually accompanied by increased heat and blow-up of the battery case and, consequently, 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 for protection of overcharging and deep discharge, as well as from exceeding the permissible temperature (over +90 ° C).

Nevertheless, you have to pay high attention to the safe handling of Li-ion batteries. Lithium-ion batteries have very high specific energy. Be careful when using and testing them.

If the battery terminals are contaminated, - wipe them with a dry, clean cloth before use. Otherwise, it is possible to overheat contacts when used in high-current mode.

Do not use the battery at high temperatures (for example, in direct sunlight, near a heat source or open flame) - when the superheat rises, the gas pressure inside the battery increases, and this can lead to an explosion, or at least to a reduction in its service life. The maximum permissible temperature at which lithium-ion batteries can be used are from -40 ° C to + 50 ° C.

The temperature range of operation should be followed. When the battery is cooled below 0 ° C, the power is reduced to 40-50%, with prolonged external heating above + 40 ° C, the self-discharge of the battery is significantly accelerated.

Do not use the battery in a static electricity environment - the safety devices may go wrong and there may be a problem with the safe use of the battery.

Do not compress, drop, or expose the battery to mechanical stress. Do not short-circuit the positive and negative contacts of the battery with metallic objects or wires. Connecting several lithium batteries, use batteries from the same manufacturer - one denomination, in the same technical condition. Do not use the battery without an electronic protection circuit.

Do not reverse the polarity of the battery. Do not connect the battery to devices that weren't designed to be powered by it.

Do not use the swollen batteries - they require a mandatory replacement.

Do not disassemble the battery - it may leak, overheat and ignite.

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

Do not solder the battery directly to the card. Do not pierce it with sharp objects.

Do not discharge the battery to the minimum. Frequent recharging is more preferred - this does not harm the battery.

Battery charging

Use a ventilated and fire-safe room to charge batteries. In case of possible ignition of batteries, they should not lead to 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, table salt, baking soda, and cover the burning battery with a dense heat-resistant cloth. Therefore, we recommend to keep sand nearby the battery charging area.

Never try to charge non-rechargeable lithium batteries! Attempting to charge these devices can cause an explosion and an inflammation that spreads poisonous substances.

Do not recharge the damaged battery!

Use only the chargers that are designed for this type of battery.

The temperature regime of charging the lithium-ion batteries affects their capacitance,

which is decreased by charging in the cold or in the heat. The charging can be conducted at temperatures 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 all wires. In case of any of the charge wires damage, they must be replaced before using the device.

While charging, install the equipment on a flat, stable, non-flammable surface. Remove all the flammable objects nearby. Charging the equipment with a built-in battery, you must follow the electrical safety measures.

Use the original charger and original batteries only. Otherwise it may cause the battery and equipment damage, short circuit, fire, explode etc.

It is not recommended to keep the charger in a socket if it is not used at the time.

When disconnecting the device from the power grid, remove it from the socket by pulling the plug, not the cord.

Never leave the equipment without attention while charging!

If a specific smell, heat or smoke is emitted while the battery charging, or the case deforms, immediately disconnect the charger from the power grid and the battery from the charger.

The charging cycle for fully discharged batteries is - for the headband (capacity 700 mAh) - 3 hours, for the tager (capacity 2200 mAh) - 5-6 hours. The full charge is reached after the voltage reaches its maximum, and the charge current decreases to 0.1 ... 0.07 A, depending on the battery model.

If the battery is swelling during the charging process, never pierce the element, especially when it is still hot. It should be placed in salt water and wait until it cools. After cooling, the outer shell can be gently punctured, and then again place the cell in salt water. After that, the battery must be recycled.

In case of abnormal situation, the lithium battery can be damaged by getting a short circuit inside while the element itself may seem unbroken. The battery should be removed and carefully monitored for 20 minutes.

In case of electrolyte from the depressurized battery contacts the skin of the hands or eyes, immediately rinse the affected area with running water for 15 minutes and consult a doctor. Otherwise, it may cause a partial or total loss of sight.

Batteries storage and recycling.

Lithium-ion batteries are not subject to long-term storage and are designed for constant active 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 need to be charged to about 50%. Long storage in a discharged state may cause the battery failure.

Store at a temperature of + 5 ° C ... + 20 ° C (preferably + 5 ° C) in a place protected from direct sunlight. Do not store the battery in a room with high temperatures or in areas with high humidity. Do not store the battery close to metal objects, such as paper clips, pins, etc.

The battery protection circuits have a low self-consumption, but nevertheless it is enough to reduce the battery voltage to 2.5 V during few months. Therefore, if the battery is not used in cycling mode, it should be periodically recharged (about once in 6 months). If during storage of the battery you notice its strong heat, the hiss

of the exhaust gas, the emitting of acrid white smoke, then immediately move it to a safe place. If the battery electrolyte has leaked out – do not let it to contact the skin, ventilate the room, utilize the battery.

Lithium, which is contained in Li-ion-batteries, melts and boils at a relatively low temperature. When the water gets inside the battery, a certain reaction with the hydrogen emitting occurs. The uncontrolled storage of such battery is potentially explosive and can cause damage to the environment.

To avoid undesirable consequences, the used elements must be collected and delivered to specialized recycle. The elements must be packaged in such a way as to avoid electrical contact with the container or other elements / battery. The leaking elements must be packaged in such a way as to localize the leak. Use the protective equipment: gloves, goggles, appropriate work clothing, a respirator, sealed plastic bags while packing.

17. FAQ

On short distances without aiming, I kill one or more players.

Possible reason

As in any torch, the tager's optical system creates an aureole at close distances sufficient to hit the hit sensor.

Solution

If the game takes place at close distances or indoors, you can use a diaphragm, by installing it in front of the lens. Depending on the conditions, the correct hole diameter is selected.

Possible reason

Inside the room at the high beam power, ricochet from the walls is likely.

Solution

Using settings in computer programs you can adjust the power of the beam to the room conditions.

When you pull the trigger, there is no shot.

Solution

Make sure that the breaker is mechanically activated by pressing. If there is no shot while pressing, disassemble the tager and check the wires from the micro switcher to the circuit board.

When you switch on the tager, nothing happens.

Solution

Splug in the battery charger and switch on the tager (deep battery discharge is possible). If the tager still does not switch on – disassemble the tager and measure the battery voltage while crossing the power button wire at the power point on the circuit board.

Tagers shoot at different ranges.

Solution

Using the remote control set the same power number to the tagers;

– in the additional settings of the program, set the same minimum and maximum power number for all kits. The factory settings are the minimum number – 45, the maximum – 90.

The Utility Box switches to the next mode by itself.

Possible reason

Switching of the utility box modes is conducted by using «new game» command. And two switched on UBs that stand side by side, can switch each oth-

er into another mode (giving the «Revival» command).

Solution

Exclude the direct visibility between UBs.

There is no connection with the bandage, the tager produces a repetitive sound of the lack of connection.

Solution

Re-assign the bandage to the tager by shooting at the bandage from a close distance. The tager must be in a service mode.

The utility box does not «Respawn» properly.

Solution

Using the digital video camera (digital camera, smartphone) check each IR diode – at the time of operation, the camera must record a white flash;

- make sure that there is a direct visibility between the sensors and the IR emitters;
- charge the UB.

One tager does not kill the other.

Solution

- Make sure that the tagers have different team colors and there are no ID numbers matching;
- if players need to defeat each other being in the same team, make sure that the «friendly» fire function is turned on;

The remote control does not work

Solution

Check if the green LED lights up when the remote control buttons are pressed. If not, change the batteries.

The tager produces short signals and «does not see» or doesn't respond to the headband.

Solution

- Charge the tag and bandage of this kit;
- re-assign the tager to the bandage in the service mode, following the given instruction; – Check the kit IDs for any mismatching of the same values on the several sets.

Statistics do not work in the program

Solution

The kits are out of the router rage.

The sound of some kits «stutters»

Possible reason

ID match on several kits.

Decision:

Change the kits ID, so that all kits have different numbers.

The kit ID has changed by itself

Possible reason

During the game, players can accidentally change the tager ID: if they switch the tager off and on without releasing the trigger, and then simultaneously press the reload button and pull the trigger.

A short press will increase the number by one, a long one (about 10 seconds) – will reset to No. 1.

Solution

Change the ID, make sure that all kits have different numbers.

The headband starts to glow with a certain color or constantly vibrate after a while.

Possible reason

Because of the headband circuit board wetting or hitting, the transistor, that is responsible for the work of a certain color, is in a slightly opened.

Solution

Replace the transistors with the ones supplied in the repair kit.

Have purchased the kit's circuit boards, but not all of them work.

Possible reason

The circuit boards may not work because of the incorrect.

Solution

Check the correctness of plugging in according to the wiring scheme, provided by technical support.

The screen lights up, but does not show anything.

Solution

Test the screen ribbon cable.

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