LASERTAG NET

Equipment
for outdoor laser tag

NETRONIC platform

**User's
manual**
Part 1
Game kits
(for laser tag gun firmware version 19.4)

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Laser tag is a fascinating military-sports game in real time and space, developing players' accuracy, speed of movement, physical endurance, quick thinking, tactical wit and team spirit.

The task of the player's team is to complete the mission (depending on the scenario) earlier than the opponent's team, while getting the laser tag gun's beam into the sensors of the players of the opposite team and not letting them hit themselves.

The main components of the equipment:

- a laser tag gun in a set with a device for fixing a hit (headband and/or vest, shock-band);
- charging devices;
- remote control;
- domination box;
- SIRIUS station;
- Multistations
- bomb Supernova

Also, for a variety of gameplay, electronic simulators can be used - "land mine", "electronic explosive device", artifacts, individual medkits, shooting gallery, etc.

Each player is given a wireless kit - a laser tag gun and a headband (and/or vest).

The equipment is set up and the game is controlled by the remote control, as well as using programs installed on a PC, tablet or phone, which also allows you to record, process and display statistics on game events.

1. Laser tag gun

A laser tag gun is a device that emits directional focused pulses of harmless infrared light. The coding of the signal is carried out at a carrier frequency of 56 kHz and a wavelength of 940 nm.

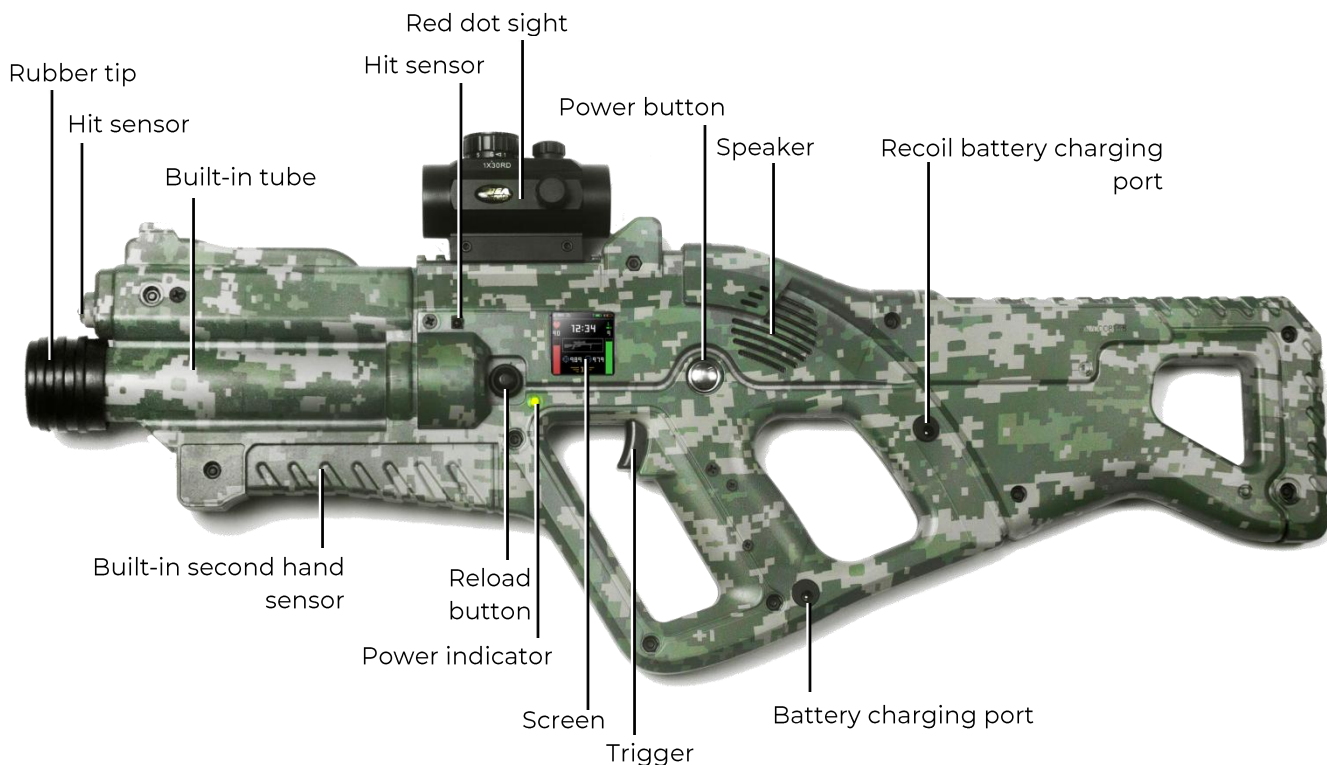As emitters, OSRAM SFH 4545. IR diodes are used.

To increase realism, the IR-beam is duplicated by a beam of visible light during a pulse.

The purpose of the laser tag gun is to get with a focused infrared ray into any of the hit sensors on the HFD - hit fixation device (headband and/or vest) of the opponent team player. In this case, the hit indicator is triggered, which is shown by the flashing of the RGB-indicators of the HFD, vibration, and a sound notification of the player's "injury" or "defeat". If one lacks health units, his laser tag gun is disabled, and the kit cannot participate in the round until it is "restored" by any device (depending on the scenario).

In firmware starting from 19.4, the laser tag gun can communicate with three devices for fixing hits simultaneously (headband + vest + shock-band SCORPION).

Also in firmware starting from version 19.1 there is an option to play without a headband or vest - only using a laser tag gun. In this case, hit sensors built into the housing act as HFDs (except for Basic equipment). This option will be convenient for hot weather, when wearing a headband or vest is quite uncomfortable. Or when the headband is used in standalone mode (see Chapter 2).

The communication of the laser tag gun and the HFD is wireless and is carried out over the air with a working frequency of 868 MHz. To configure, manage and remove statistics using a server and computer programs, a Wi-Fi channel is used.

Red dot sight
Hit sensor
Rubber tip
Power button
Hit sensor
Speaker
Recoil battery charging port
Built-in tube

Built-in second hand sensor
Reload button
Power indicator
Screen
Trigger
Battery charging port

The main elements of the laser tag gun on the example of an assault rifle Falcon F2*
(equipped with Tactical Pro)

The laser tag gun, depending on the order, can be equipped with an IPS (color) screen, a collimator sight, hit sensors, a recoil simulator, a second-hand sensor. In addition, the Falcon LUX model has side and front shot illumination in the color of the team.

Set	Rubber tip	Screen	Hit sensors	Impulse recoil	Aqua-printing	Red dot sight	Second hand sensor*
Basic	✔						
Standard	✔	✔	✔				
Premium Edition	✔	✔	✔	✔			
Tactical Pro	✔	✔	✔	✔	✔	✔	

* This option is available for an additional fee.

The laser tag gun can operate in three modes - "service", "standby" and "game".

1.1.   Service mode

You can go to service mode by turning on the device with the trigger held down. In service mode, the screen displays the identification number of the kit, the status of the connection to the server, the battery charge of the laser tag gun and HFD, the version numbers of the firmware, and the name of the hotspot to the server.

The information is displayed on two main screens - the firmware versions of the laser tag gun are shown on the first screen, and the information about the firmware versions of the headband/vest and shock bracelet is shown on the second screen. Double click on the power button to switch between the screens. The information can be displayed in two different methods. The first one shows hexadecimal designation of the firmware version, and the second one shows the date and time of its updating. Double click on the laser tag gun reload button to switch between the display methods.

Two options for displaying the laser tag gun's firmware

Display of headband/vest and shock-band firmware

In this mode you can:
- change the identification number (ID) of the laser tag gun;
- assign a laser tag gun ID to any headband (bind any headband to the laser tag gun);
- change some settings using the Remote Control (for firmware versions higher than 17.0.60).

1.1.1. Change laser tag gun ID

Upon delivery, all kits have different numbers, but inside the kit, both the laser tag gun and the headband (vest) with their identification numbers (ID) must correspond to each other.

In service mode, it is possible to change the laser tag gun ID. For that, you need to:

1. at the same time hold the trigger and reload button for 8-9 seconds;
2. after the sound signal, release the trigger and button - the kit ID will be reset to the 1st number;
3. briefly pressing the reload button to set the desired number (the change in the number will be accompanied by a sound signal);
4. turn off the laser tag gun by holding the power button.

After changing the identification number of the laser tag gun, it is necessary to "tie" a headband or vest to it, i.e. assign the same number (see Ch. 2.5).

1.1.2. Changing settings using the Remote Control

Starting with the laser tag gun firmware version 17.0.60, in service mode, the ability to change some settings of the kit using the Remote Control has been added.

To do this, you need to direct the transmitter emitter to any of the sensors that hit the kit and press the corresponding button. The following settings are possible:

1. select hotspot:

Button	Hotspot name
⊕	LASERTAG
🦇	LASERTAG-NET
🙂	MGO
⚙	Test mode
✛	OTK
💣	TechSupport

2. set the sound volume level (❋ - increases, 🔇 - decreases);
3. change the HFD display mode (press the button ✕). Each press will produce a different sound: system sound for normal mode and ricochet sound for inverse indication;
4. enable auto-reload - press the button 🔴 , disable - 🔵 .

1.2. Standby mode

The kit is turned on by pressing the power button of the laser tag gun and the control unit of the HFD (headband, vest) and shock-band for 3 seconds, and goes into standby mode.

Since hitters are installed on laser tag guns of almost all configurations (except Basic), in this mode the laser tag gun is ready to receive commands for changing settings and launching the game. But in order to conduct the game without HFD, it is necessary to check the corresponding item in the program in the settings of the kits. If this is not done, then when the laser tag gun is turned on after 5 seconds, a message on the operation of the cheat detector (CD) will be displayed on the screen. A similar reaction will occur if the player independently turns off the headband or vest during the game.

🛈 **Most of the scripts built into the program have the "Game without a headband" mode turned on by default.**

A complete individual kit can consist of four devices - a laser tag gun (main) and three slaves (slave). A slave can be, for example, a headband, a vest, and a shock bracelet. Or another set - two headbands and a vest. But there is only one shock bracelet in a kit.

If, after their turning on, the individual numbers of the individual components of the kit coincide, the sensors on the headband or vest begin to blink smoothly in the color of the

team, and the control unit of the shock-band plays a sound signal. Images of the batteries of the devices connected to it will appear in the top line of the laser tag gun screen. (T – laser tag gun, S – shock-band, H - headband, V - vest).

If there is no connection to the server, the Wi-Fi icon or 2 letters of the abbreviated network name (with 4 devices) glows gray, when connected to the network it glows green.

In standby mode, the instructor through the computer program or using the remote control has the ability to change the color of the team, add ammunition, increase the number of health units, set a scenario preset, etc., and also start the game round.

1.2.1. Setting presets using the remote control

It is possible to set a preset (role) for the kit with the help of the Remote Control, using special buttons. At the initial start, by default, the "Special Forces" preset is installed on the kit. The player has 100 health units, only one type of weapon is a assault rifle (damage 25, ammunition 100 magazines of 30 rounds).

Starting with firmware version 19.2, presets can be edited in programs for Windows and Android, and when playing a game with the server, the preset parameters configured in the program (custom) are applied. They are sent to the kit via wi-fi channel.

If the game is played without a server, then when you turn on the kit for the first time, the settings that the kit had before turning it off, including custom ones, are used. If during the game one direct the remote control at the player's sensors and press any preset button, these settings are reset and the kit get the settings programmed by default. The main parameters of presets by default are given in the table:

Preset	Medic (1. Medkit)	Medic (2. Gun)	Vampire	Zombie	Hostage	Sniper (1. Sniper rifle)	Sniper (2 Gun)	Storm trooper (1. Assault rifle)	Storm trooper (2. Underbarrel grenade launcher)	Special Forces (default)
Remote Control Button										
Number of health points	100		250	200	300	100		100		100
Invulnerability time, sec	1		1	2	3	1		1		1
Shock time, sec	1,2		1	1		1,2		1,2		1,2
Auto-regeneration time, sec	0		0	0	0	0		0		0
Friendly fire*	no		no	yes	yes	yes		no		no
Inverse indication	no		no	yes	no	no		no		no
Weapon	1. Medkit	2. Gun	Bite	Claw	no	1. Sniper rifle	2 Gun	1. Assault rifle	2. Underbarrel grenade launcher	Assault rifle
Damage, health units	25	25	10	h/2**		100	25	25	100	25
Rapidity of fire, shots per minute	300	180	300	200		30	180	545	100	545
Shooting mode	Single shots	Single shots; Burst mode; Burst duration until empty	Single shots	Single shots		Single shots	Single shots; Burst mode; Burst duration until empty	Single shots; Burst mode; Burst duration until empty	Single shots	Single shots; Burst mode; Burst duration until empty
Shooting mode change	no	yes	no	no		no	yes	yes	no	yes
Quantity of spare clips, pcs	0	2	0	20		4	2	10	3	100
Amount of cartridges in a clip, pcs	10	10	999	30		10	10	30	1	30
Shots in the burst, pcs	1	3	1	1		1	3	3	1	3
Reload time, sec	1	1	1	1		4	1	3	6	3
IR-beam power, %	50	50	60	20		100	50	60	30	60

*Friendly fire in an individual setting means that the kit can be hit not only by the players of the opposing team, but also by the players of own team.

** h/2 - When a zombie hits a player, it takes away half his health units

- Single shots
- Burst mode
- Burst duration until empty

Each preset has its own characteristics. So, a kit in the role of a Vampire loses 1 unit of health every 5 seconds (the so-called "thirst"). Also, on him and on Zombies, the Medkit and Radiation produce the opposite effect - the first takes health units, and the second replenishes. A zombie turns an affected opponent into a zombie, and when Vampire hits a player, he not only reduces his number of health units, but also attaches them to himself. Read more about presets in part 3 of this manual.

When assigning presets from the Remote Control, the parameters recorded in the firmware of the kit are used, but they can be corrected by increasing the number of health

units and changing the power of the IR beam by pressing the corresponding buttons of the Remote Control.

Presets can be edited in the Android program and when playing with the server, the preset parameters configured in the program (custom) are applied. They are sent to the kit via wi-fi channel.
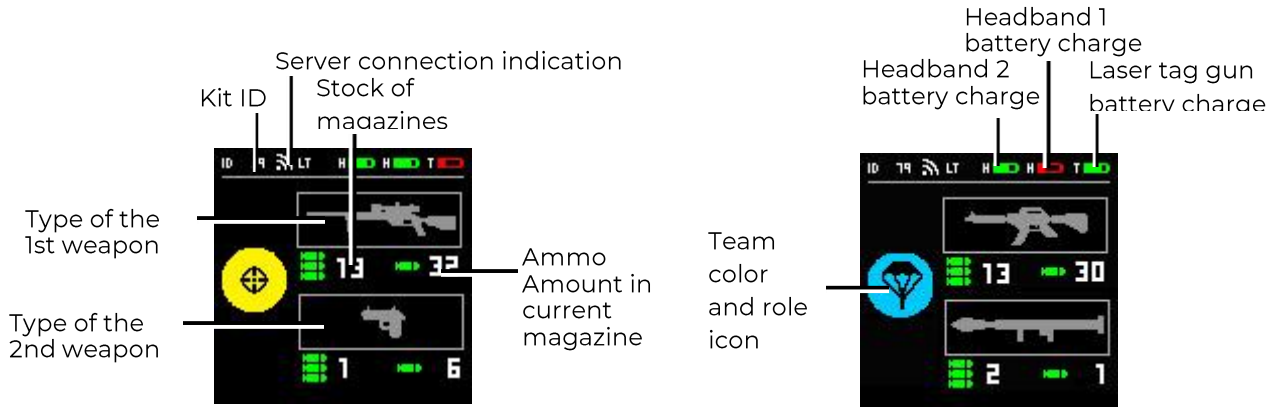
IPS screen when selecting kit configuration

IPS screen with two / three connected HFDs

1.3.   Game mode

You can control game kits using both the remote control and the programs installed on a computer or smartphone (tablet).

In order to start the game using the Remote Control, the kit must be activated:

1. Turn on the kit and make sure that the laser tag gun, HFD and shock-band are "tied" to each other (headband or vest indicators blink smoothly in the color of the team, the shock-band mode LEDs go out, and the battery icons of the connected devices appears on the laser tag gun screen).
2. If necessary, select one of the presets - point the emitter of the remote control to any of the HFD sensors and press the corresponding button on the remote control.
3. To start the round, click the "Start Game" button.
4. Upon successful activation, the sound message "Go, go, go!" or "Start" is played, the RGB-indicators of the HFD once light up with the color of the player's team and go out. The shock-band reacts to the start of the game with a short vibration signal.
5. During the game round, a player can hit opponents with the infrared beam of his laser tag gun, interact with additional devices and be hit by opponents in the sensors located on his kit (headband, vest or laser tag gun).

Setting up and managing game kits from computer programs are described in part 3 of this manual.
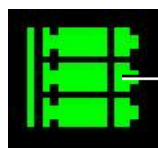
If an IPS screen is installed in the laser tag gun, during the game it displays information about the kit parameters, current individual statistics and the round timer:

Screen menu during the game
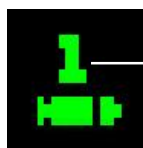
Single shots

Burst mode

Burst duration until empty

Pictograms keys of firing modes

During the game, the screen displays almost all the events occurring with the kit:

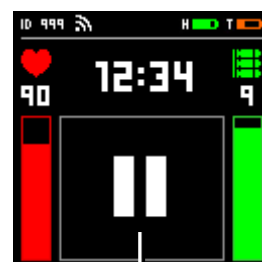Health units doubled

Two-hand absence sensor tripped

The player was affected by Med KIT

The player was affected by Radiation

Zombie damage received

Game paused

Also briefly it shows the individual number of the opponent which the player hit, and the ID of the player who hit him.

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

Decoding characters on the screen during the game

During the game, it is monitored whether external hit fixation devices are turned on. And if this is not provided for by the kit's settings, when the player arbitrarily turns them off, the message about "cheating" is displayed in the computer program and on the laser tag gun screen:

Cheat detector alarm

At the end of the game round, brief statistics are displayed on the screen.

The number of hits in the opponents

The number of defeats from the opponent

Place in rating

The number of defeated opponents

The number of points gained

IPS screen at the end of the game

<u>Turning off the laser tag gun</u> - hold down the power button for 7-8 sec in standby mode and for 12-13 sec in game mode.

1.4. Reload button

The reload button located on the laser tag gun body, in addition to directly simulating a store change, also allows you to change the shooting mode and current weapon (if allowed in the kit settings).

As a rule, for each new game, the laser tag gun is equipped with limited ammunition (clips with cartridges). After a player shoots a clip, when pressing the trigger, he hears sounds imitating a misfire.

To resume firing, briefly press the reload button. At the same time, the characteristic shutter sound is played, and the laser tag gun is again ready for game. Reloading can be done before emptying the clip.

To change the shooting mode (with single "shots", a fixed burst, usually 3 rounds each, and an endless burst until the magazine is empty), you need to press the reload button twice with an interval of less than 1 second. If the mode change is successful, a beep will sound. When changing weapons, the shooting mode is maintained.

Starting from the laser tag gun firmware version 17.0.60, it is possible to assign roles to kits, among which there are those that have two types of weapons in their arsenal. So, the Medic has a Medkit and an assault rifle, the Storm trooper has an assault rifle and an underbarrel grenade launcher, the sniper has a rifle and a gun.

To change weapons, you must hold down the reload button for about 3 seconds until the sound signal starts to play.

All parameters of the laser tag gun (the number of clips, cartridges in them, reload time, rate of fire, interval of the player's invulnerability, etc.) are programmed using programs installed on a PC, tablet or phone.

1.5. Collimator sight

The Collimator sight is a lens or a system of lenses projecting an aim mark in the direction of the player's eye in a parallel flow, so that for accurate aiming it is enough to combine only two points - the luminous mark that he sees through the eyepiece and the target itself. Moreover, even shifting his gaze to the side, the shooter still sees the aiming dot.

Elements of the backsight on the example of the Bushnell 1x0 RD

The aiming mark in the Bushnell 1x0 RD model is a red or green dot. The color and brightness of the aiming dot is set using a 12-position rheostat.

To fix the backsight on the case of the laser tag gun, insert it into the upper Picatinny rail and tighten the fastening screws. The power is turned on (CR-2032, 3V lithium battery) by turning the rheostat in any direction, while the red or green aiming dot should light up.

Horizontal and vertical adjustment of the angular corrections of the red dot scope is carried out by turning the clicks of the adjusting screws closed by the protective caps.

Targeting a laser tag gun with a fixed backsight can be done using an electronic shooting range or another set of laser tag gun-headband.

1.6.   Charging batteries of the laser tag gun

Depending on the delivery set, the laser tag gun can be equipped with one or two (for guns with impulse output) sets of batteries. Each of them has a separate charger connector.

The charging cycle for fully discharged batteries is 5-6 hours when using charging with an output current of 1 A, or 2 hours when using charging with an output current of 2 A for a laser tag gun (capacity 2600 mA/h).

2. Headband/Vest

A headband and/or vest are included with each player and are devices for fixing and indicating a hit. They consist of a textile base, a control unit and from 4 to 9 sensors. The current 5.2 firmware of a headband or vest is compatible with the laser tag gun 19.4 firmware. Some features are not supported during the using of the previous firmware versions.

2.1.   Headband textile base

The base of the headband consists of 2 layers. External - from durable wear-resistant cordura fabric. Velcro-style textile fasteners are sewn on the inside for attaching a sweatband and a moisture-proof zipper. The headband design allows, if necessary, to extract electronic components and wash the textile base.

❗ **Due to the fact that the headband is used in high humidity conditions, it is recommended to check periodically (once every two weeks) the functionality of the fastener by opening and closing. If it is difficult to slide the slider, lightly rub the prongs along the entire length of the zipper with a household paraffin candle or dry soap.**

The headband is completed with a sweatband, which is used when playing without a headdress. The band is made using a volume mesh "air-mesh", which provides air circulation between the headband and the player's body. The band, if necessary, can be easily detached for sanitization.

❗ **Before washing, it is recommended to fold the band so that the spiky segments of the textile fastener (hooks) are connected to each other.**

To change the size of the headband it is necessary to use a textile fastener, which is set in the desired range. To fix on the player's head, the headband has an elastic insert.

Sweatband   Elastic insert

Hit sensor

The appearance of the headband

2.2. Vest textile base

The base of the vest consists of 3 layers: the outer one is also made of cordura fabric, the middle layer is foamed polyethylene (protects the wires from mechanical stress) and the inner layer is PVC, which prevents the effects of the fumes of the human body on electronic components and allows sanitizing the inside of the vest between rentals. For handling, it is recommended to use antibacterial wet wipes.

To change the size for the player's complexion on the vest, adjusting buckles on latches are provided.

2.3. The electronic components of the headband and vest

The electronic components of the headband and vest are almost identical. The difference is only in the number of hit sensors. The headband has 4 (3 around the perimeter of the headband and one in the control unit), and the vest has 9 (6 on the front, 2 on the back shoulders and another one also built into the control unit).

Textile base

Control unit

Adjustment
buckles and belts

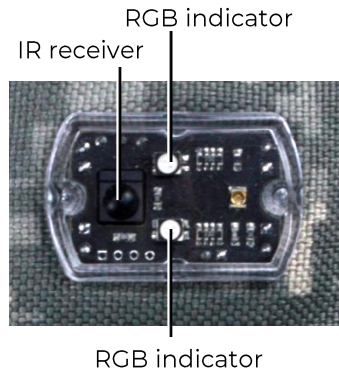Hit sensors

External elements of a vest

Inside <u>the control unit</u> there is an electronic board on which one of the hit sensors, a vibration device, and a battery that is charged by the charger through a special connector, are installed. The connector, as well as the power button located on the case, is closed from contamination by a silicone plug.

The board has 4 LEDs (3 green and one red), which show the dynamics of turning the device on and off. In addition, when the device is turned on, when you press the power button briefly, they show the battery level: 100% - all LEDs are on, 75% - two green and one red, 50% - green and red, 25% - only red, from 25 to 12% - the red LED blinks 2 times per second, less than 12% - blinks 4 times per second.

In addition to the IR-receiver, an IR-emitter is installed on the control unit board, which is used in some HFD operation modes.

Power button

Battery Charging
Indicators

Battery charging slot

RGB indicators

Control unit
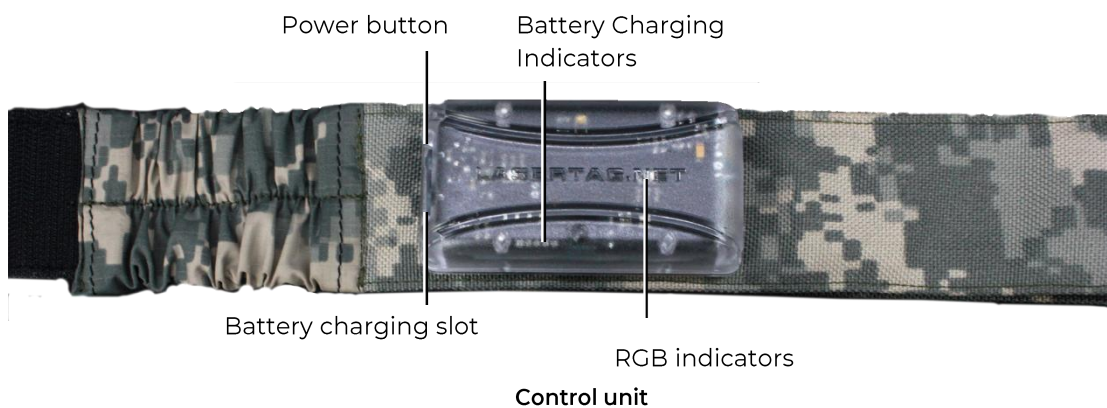
The hit sensor is an electronic board on which an IR-receiver (Vishay TSOP 4856), an IR-emitter, 2 RGB-indicators and other auxiliary elements are placed in a transparent case.

Headband/Vest Hit Sensor

An IR-receiver detects an infrared ray from an opponent's laser tag gun.

RGB-indicators depending on the task can glow in 6 colors: red, green, blue, yellow, violet and white. They can show the color of the player's team, signal about the hit of the opponent's beam, react to their inclusion, binding to the laser tag gun, etc.

Also, an IR-emitter is installed on the hit sensor board, which is used in the autonomous mode of operation of the HFD to simulate a through wound, etc.

2.4.　Headband/Vest activation

The connection between the headband with the sensors and the laser tag gun is carried out wirelessly. The operating radio frequency of the game kit is 868 MHz.

The headband or vest is turned on by pressing 3-4 buttons on the control unit. After turning on, the device goes into the search mode for a laser tag gun with an identical ID, if it is absent, the sensors glow with an overflow of 3 colors and an intermittent buzzer signal is played. The procedure for linking the HFD to a laser tag gun is given in Chapter 2.5.

When a "related" laser tag gun is detected, the display sensors blink with the color of the player's team with a frequency of 1 second.

In game mode, the electronics of the headband or vest constantly monitor the availability of weapons. If at this moment you turn off the laser tag gun with the identical ID or place it at a distance of more than 3 meters, the indicators will also light up with an overflow of 3 colors and the buzzer will signal.

The control unit is turned off by a long press (about 3 seconds) on the power button.

2.5.　Binding a headband or vest to a laser tag gun

1. Turn on the HFD (headband or vest) that needs to be tied - the indicators will glow with overflow of different colors.
2. Turn on the laser tag gun in service mode (hold the trigger and the power button) and fire a shot at any of the HFD sensors. To exclude accidental attachment to devices nearby, the power of the emitting IR-beam in the service mode is 1%, so the shot must be fired at close range.

3. If the binding is successful, the RGB-indicators of the headband or vest flash once in white, and the HFD receives the ID of the laser tag gun.
4. Turn off the kit by holding the power button on the laser tag gun and pressing the HFD power button.

2.6. Game mode

During the start of the round of the game after a command from the server or the remote control ("Start the game" button), the RGB-indicators respond with a short flash of the team color and turn off. In the inverse mode, they continue to glow (blinking at the vest).

The kit reacts to the opponent team or additional device ("Radiation") <u>beam</u> from the laser tag gun beam as follows:
- If the player still <u>has health units</u>, the LEDs of the sensor into which the opponent's beam hit, often blink white for several seconds, and the LEDs of the other sensors - the color of the team. Through the speaker of the laser tag gun, it is reported that the player is injured ("I am wounded" or "Last life"). Moreover, a certain time, which is set by a computer program, the kit is invulnerable. This option is made so that the player does not "get out" of the burst of shots.
- A headband or vest reacts to a player who has a "last life" <u>hitting</u> into the sensor by frequent flashing white and a long vibration signal. The speaker of the laser tag gun reports: "The player is lost - we are returning to the base", the laser tag gun stops emitting impulses and the player should be sent to the base for recovery. The headband/vest indicators flash alternately in white until rebirth.
- In the <u>firmware version from 19.1</u> for HFD in the program mode the option "Through wound" can be turned on. This means that when it hits one of the sensors, the shot goes "through" as if - the IR-emitter of the headband or vest hits the player standing behind.

2.7. Standalone mode for headband or vest

Starting from firmware version 19.2, the headband and vest can function autonomously, without a laser tag gun. Given that the laser tag gun, with the corresponding settings, can also be used without HFD, this function allows not only to diversify the scenarios, but also to increase the number of players involved in the gameplay with a limited number of kits.

Since there is no Wi-Fi module in the control board of the HFD, and there is no way to connect to the network, configuration and management is carried out only using the Remote Control.

At the moment, 5 battery life modes are implemented: "Activator", "Medic", "Zombie Player", "Frontier" and "Hostage".

To activate them, just turn on the HFD, point the Remote control emitter to the sensors of the headband or vest and press the corresponding button.

In each of the modes, the player has 100 health points, and to hit him, when the weapons damage is 25, you need to get into the kit 4 times.

The "Activator" is activated by the button of the remote control "Preset Storm Trooper" - the sensor LEDs light up in red. The color of the team is assigned by the buttons on the Remote Control "Assigning the color of the team". To start the mode, you must click the "Start the game" button, while the HFD will respawn every 10 seconds the players of their team who are in the radius of the IR-rays (about 3 meters).

The "Medic" mode works in a similar way, but in this case, after activating the mode with the "Preset Medic" button ⊕ , the LEDs light up in yellow. After the start, a player with a headband or vest will distribute 25 health units to his neighbors in a radius of about 3 meters every 5 seconds.

The "Zombie Player" (activated by the "Zombie Preset" button 🔫), on the contrary, deals 5 times per second damage of 100 units. After turning on the mode, the LEDs of the HFD sensors begin to flash in blue, and after starting the "Start" button flashes the same color every 10 seconds. The mode has advanced settings - by changing the power of the IR-beam, you can adjust its range. To do this, after activating the mode, you need to point the Remote Control to the headband and click the "Change IR Power" button ✳ . You can select 4 modes: 1, 2, 5 and 10 m - each press of the button changes the range values in a circle. To determine the value, you need to press the button until the headband buzzer sounds low. It will correspond to 1 m. The next press will assign a range of 2 m, and so on.

The "Frontier" mode is more suitable for the headband. Designed for the passage of the route with the defeat of several headbands in series. In order to make it impossible to get closer to the headband, it releases radiation (50 health units are taken away every 2 seconds). Until a headband is struck, there is no way to hit the next. The mode is activated by the "Sniper" preset ◈ - the LEDs light up in red. The radius of the impact is up to 7 meters.

Activation of the mode by the "Start the game" Remote control button - the headband starts blinking once a second. The number of shots to defeat the device is regulated by weapon damage. Sensors react with a white flash to hit. After deactivation, the headband often blinks green for 8 seconds, indicating that the pass is allowed, and then goes out and after another 20 seconds it becomes active again.

The simplest standalone HFD mode is "Hostage". It is turned on by the remote control button "Hostage Preset" ⚭ . The LEDs light up in purple and after that it is necessary to select the color of the hostage team - press the desired button "Assign team color". It is used in the scenario when a player needs to be navigated along a specific route, not allowing the opponent to hit him. The hostage has 100 health.

Each mode is disabled by the "Delete" button ✕ .

3. Shock-band SCORPION

The shock-band SCORPION is essentially an analogue of an electrical muscle stimulator and can be part of a laser tag game kit. Device is worn on the arm (wrist) or foot (ankle) and is designed to indicate the tactual coded infrared ray entering the sensors of the player's kit. Indication is executed either by vibration or light electrical impulses, which cause quite an unpleasant tingling sensation at the place where the electrodes come in contact with the skin. It encourages the player to take a more responsible approach to the gameplay.

The shock-band uses direct current pulses that are safe for humans in its work, but nevertheless, some caution must be exercised. Using the device may not be compatible with cardiac pacemakers and other electronic devices to maintain human health and life.

❗ **It is recommended that you consult your doctor before using the shock-band.**

The body of the control unit is made of polycarbonate, the electrodes are made of conductive rubber. The device is attached to the arm with two textile belts with Velcro. For reliable fastening, it is necessary to tighten the straps as much as possible on both sides and fasten the Velcro - combine the prickly and soft parts. Velcro must be fastened tightly and over the entire area of the connection.
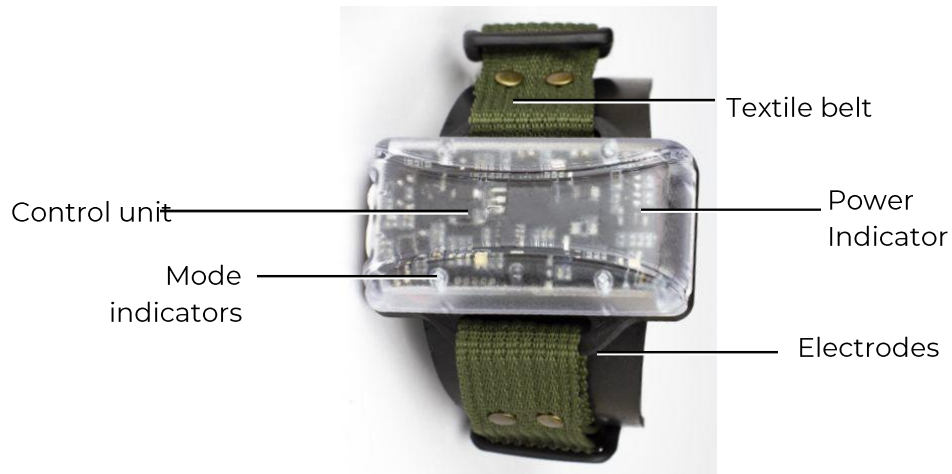
Overall view of the Shock-Band

SB has 5 indication modes: vibration and 4 power levels of electrical pulses.
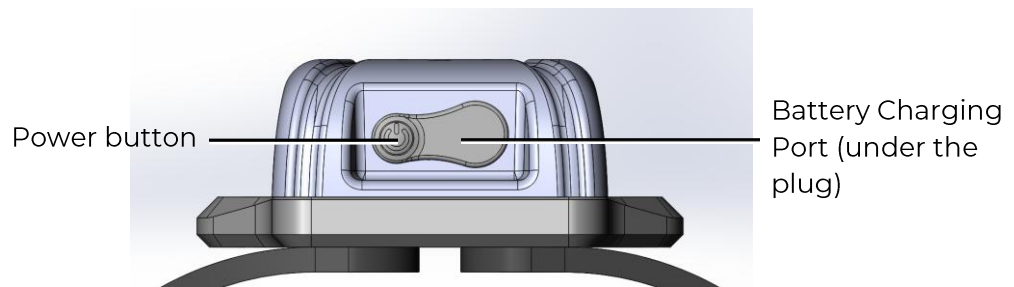
External elements of the control unit

The functionality of the device directly depends on the density of fixation of the electrodes and the resistance of the skin of the user, which at each player can be different and vary depending on the physical and emotional state.

⚠ **It is recommended to wipe the electrodes with a wet wipe to disinfect and improve body contact before the game.**

Turning on occurs after two seconds of pressing a button located on the control unit.

On the electronic board of the control unit, 4 multi-colored LEDs are installed. If after turning on these diodes light up in the sequence 1,2,3,4,3,2,1, this means that the shock bracelet is not bound with the kit.

The binding is carried out similarly to the connection procedure for the headband (Chapter 2.5.):

- turn on the laser tag gun in service mode (with the trigger held down) and a shock-band;
- point the laser tag gun emitter to the control unit of the shock-band;
- firing a weapon.

In this case, the device is assigned the ID of the laser tag gun from which the shot was fired. In the future, when the connection with the kit is lost, the shock-band emits a sound signal.

If the binding is correct, the mode LEDs go out and only the battery charge indicator glows.

The shock-band reacts to the start of the game with a short vibration signal.

With proper binding, the device turns on by default in vibro mode. Modes can be changed by successive pressing of the power button.

5 LEDs are installed on the electronic board of the control unit, which clearly show in which indication mode the device is operating. The glow of the leftmost (relative to the inscription "Lasertag.net" on the block cover) of the LED in red means that the Shock-Band is in vibration mode. ⬤ . The glow of the next LED in green ⬤ corresponds to the first power level, the glow of the second LED in green and the third in yellow ⬤⬤ – the second one. At the third power, the fourth LED glows in orange ⬤⬤⬤ . When four LEDs glows ⬤⬤⬤⬤ – SB is at the fourth power level.

The pulse power should be selected personally, depending on the age, gender and individual characteristics of the player. You need to start from the weakest level, gradually increasing power. It should be appreciated that during active games such as laser tag, players sweat, and accordingly, the sensitivity of the skin will increase.

In addition to these four diodes, a separately located (green-red) diode for indicating operation and battery life is embedded into the board. It constantly glows green when the charge is above 30% and the device is turned on, blinking green from 30 to 10%, red from 10 to 1% and blinking red when the charge is below 1%.

After selecting the display mode, the device is ready for the game process and now every time the sensors on the headband or vest detect the infrared ray of the opponent, the player will feel a tactile impulse.

In some game modes, the shock-band response is not currently implemented. The device does not operate when attacked by a zombie, a "bite" of a vampire, defeat of a player by radiation and a "blast wave" (the mode is effective when running games through the Lasertag Operator program, see pt. 3 of this manual).

When a player is hit - "injured", vibration or current impulse is triggered once. When a player is deactivated, either a single (default) or three-time vibration or current pulse is triggered. The parameter is configured in the program.

Starting with firmware version 6.1, it became possible to set the display mode from the Remote Control. To do this, you must independently program one of the function buttons of the remote control (with dots) to the 8F5D command.

Turning off the shock-band SCORPION is performed in the same way as turning it on - by pressing the button located on the control unit.

4. Flashing microcontrollers of gaming devices

The need to update the firmware of microcontrollers for gaming devices for laser tag 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 necessity and possibility of installing new firmware on existing equipment, it is recommended to consult with the company's technical support staff. Otherwise, there is a great risk of equipment becoming unusable.

Due to the fact that starting from the laser tag gun firmware version 19.0, the microprocessor flashing procedure has changed a lot, it is not recommended to carry out this procedure yourself. Therefore, you must contact the technical support service of the company, whose specialists will perform the necessary operations using remote access online.

To determine the current firmware version number, you need:

1. Turn on a headband or vest.
2. Turn on the laser tag gun in service mode (with the trigger held down).
3. On the laser tag gun screen under the inscription "TAG MAIN VERSION" the version of the gun firmware will be displayed, and under the inscription "TAG BOOT VERSION" - the version of the Boot firmware is shown.
4. Double-click on the power button to switch to the second screen. On the second screen, under the inscription "HB_5 VERSION", the firmware version of the HFD is displayed.
5. To view the date and time of the firmware update - double-click the laser tag gun reload button.
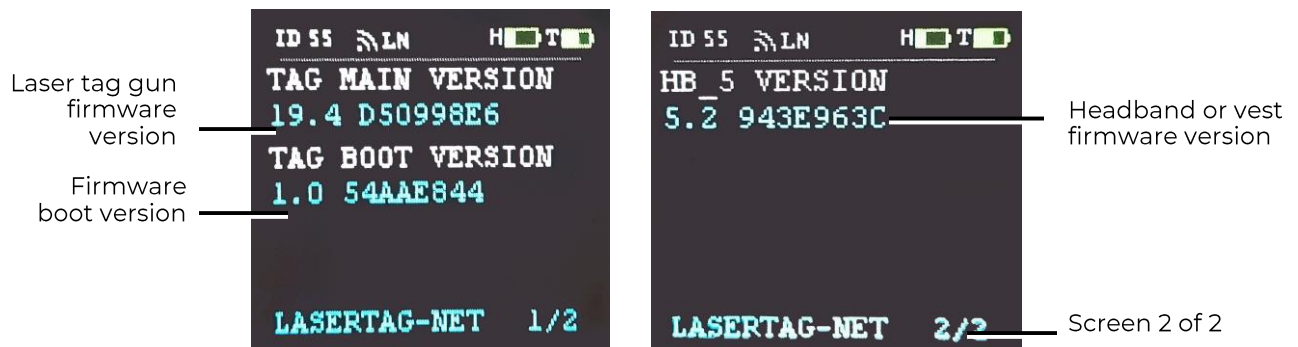
Firmware versions on the laser tag gun screen

Technical support contacts are listed on the company website: https://lasertag.net/support/

Parts 2 (Optional Devices) and 3 (Software Setup) The operating instructions for the outdoor laser tag are available for download at: https://lasertag.net/manuals/