USER GUIDE for SATR CODE V2.4C+

By Peter & Nicole Lander

This is the A to Z guide of how to use the SATR (Small Arms Transmitter Receiver) system by Battlefield Sports for version SATR code version 2.4c & later.

[USER GUIDE FOR SATR CODE V2.4C+]

FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CE Compliance

BATTLEFIELD SPORTS

BATTERY WARNING

If charging the gaming gun batteries whilst they are inside the case:

DO NOT CHARGE THEM AT MORE THAN 1.2 AMPS

Doing so may over-heat the battery.

PETER LANDER

Founder, Battlefield Sports

Contents

SATR Quick Start

1.1 Quick Stat (UNLOCKED mode)

- *To switch the gaming gun on, turn the key ¼ TURN clockwise.*
- *These gaming guns are pre-set on complex mode, which means you can change all sorts of settings.*
- *The sensors are mounted on a headband. The headband goes **over** a head wrap or hat. The headwear tells the teams.*
- *You will see a series of "boot-up" screens. The start-up screen (shows the battery level), then the copyright screen. Next is the welcome screen. This welcome screen shows which emulation the unit is set on, in this case it's a "P90." You can select from 69 weapons, each one has its own sounds effects & settings. It also shows which Battle Group the unit is set to (you can have 4 separate groups playing in the same vicinity without crossfire)—in this case you are in Group 1 on Team B. This means this player can only shoot gamers on Team A. It shows that you are on **Standard difficultly level** & have 5 hit points. It also shows that your battery has 7.5volts of power, which is basically full power. Next it shows that this unit has software code version 2.0y. On the last line it lets you know that the voice feedback is a male voice speaking English. All these elements are configurable.*
- *Pull the trigger & you will hear "mission start" and see the countdown screen. After a moment you will see the ready screen. The first line shows HP 5/5 =5 hit points available out of a possible 5. A 50/50 = Ammo 50 out of 30. R 4/4 = reloads 4 left out of a possible 4. H= hits. K = kills. A-100% Accuracy percent. S=-0 number of respawns. Med= medium range. 1B= battle group 1, B means this gaming gun is on Team B, i.e. Friendly fire is off. Status= ready. FA=full auto.*
- *After a few seconds your gaming gun is ready to go.*
- ***Take the key out** to play.*
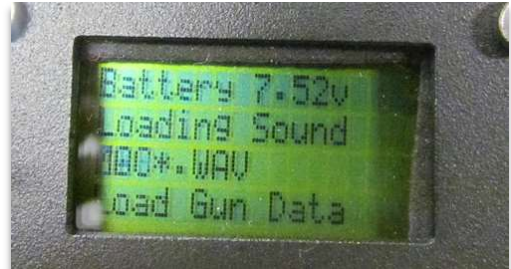
- *There are 2 mounted on a headband using Velcro & elastic. The headband goes over a bandanna or hat. And there is 1 on the gaming gun barrel. Each time a player tags an opponent; it says "casualty". A gamer can only be hit once per second. The number of times you've got someone is shown on your display after the letter H (H is for Hit). Once shot 5 times you'll hear the "arrrrrrrrgh!" sound effect and the unit is dead. On the shooter's gaming guns you'll hear "kill confirmed". Reload ammo by pushing left button once and let go (do not hold down).*

- *If dead you'll need a respawn. This is done with a Battle Box. To turn on your Battle Box, turn the key ¼ TURN clockwise, and press the big black button.*

- *When you are not using them, or have finished playing turn the gaming guns off & turn the medic boxes off using the key (¼ TURN anti-clockwise). Please make sure everything is turned-off with the key before you pack the equipment away.*

- *The unit will remember what you set it to last time you played so you can re-used them quickly.*
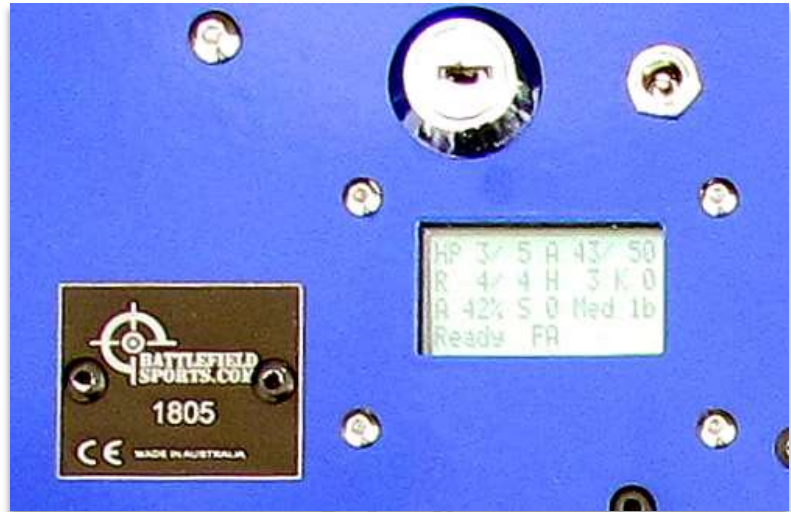
1.2 Quick Start (LOCKED mode)

- *To switch your phaser on, turn the key ¼ TURN clockwise.*

- *These gaming guns are pre-set on "lock out" mode, which means you can change a limited number of settings. The gaming gun will start automatically*

- *The gaming guns are pre-set, so the blue team (team B) can ONLY hit the red team (Team A). (The blue team CANNOT hit the other blue team members. Likewise red team cannot hit others on the red team.)*

- *To play: Aim at the headbands or the barrel (that's where the sensors are). Each time a player hits an opponent; your gaming gun says "Casualty" or "tagged" depending on the language setting. Number of hits or tags is shown on your display after the letter H or T.*

- *The gaming gun on **easy difficulty level** will automatically reload once all your ammo is used up in that clip.*

1.3   Quick Start: Gaming Gun Settings
BOOT TO LAST CONFIGURATION
A gaming gun remembers its setting between boots. After turning the gaming gun on, wait a couple of seconds and then pull the trigger. Then you are ready for action!

BATTLE GROUPS & TEAMS
This system can play up to 4 battles simultaneously without crossfire. So, for example, you have a private group for Michael's Buck's Party and another separate group of people, for a Corporate Team Building booking, these two *battle groups* can play in the one area without interference.

If it seems that one gaming gun cannot shoot another, double-check that all gaming guns are set to the same battle. If the shooting gaming gun is on battle 1 and the target is on, say, battle 3 they will not hit each other.

Within each battle group you can also set the TEAMS. We recommend operating with friendly fire off, and dividing your players in half so one half is on TEAM A and the rest on TEAM B. Please note TEAM A gamers will not be able to shoot others on their own team. TEAM A gamers can only hit people from TEAM B. If you are having trouble, double-check that you are not trying to shoot someone on your own team. **Never mix friendly fire on and team settings.**

A gaming gun in "ready" state will show on the 3rd line of the LCD, far right side the battle and the team.   For example the LCD may say "1X", this means battle 1 and friendly fire on.   Another example would be "2B" this means battle 2, B team.

RE-SETTING FREQUENTLY CHANGED SETTINGS
- Turn the gaming gun on with the key
- Push the left (red) button
- Set the difficulty level required using the left or right button
- Pull trigger to lock in selection
- Select weapon from list based on current gun class
- Select the spare ammunition measured in magazines
- Select heath in hit points
- Select language for audio
- You will then return to the initial boot screen.
- To enter live state now, pull the trigger and wait a few seconds, then you are ready to play!

CHANGE RARELY USED SETTINGS
- Boot the gaming gun with the key

- Push the right (black) button
- Gun Reset[1] (YES/NO) Choose yes to return to factory default settings.
- Pull the trigger to move to the next menu.
- Select device role—Choose "weapon mode" for a gaming gun.
- Zombie Mode – disable for standard games
- If all gaming guns have friendly fire ON, then all gaming guns on the same battle can hit each other. We recommend, however, using the team settings (Team A & Team B) and to turn OFF friendly fire, so only Team A gamers can hit Team B, and cannot hit members of their own team. Never mix friendly fire ON gaming guns with gaming guns set to teams.
- Set battle, recommend all gaming guns remain on battle 1
- Select gun class (ideally consistent with the gaming gun case)
- Select FIRE MODE—Shooting = normal game-play i.e. one hit, takes one HP off your opposition. Killing = one shot, one kill.
- Select realism mode; normally this Blanks Disabled.   If blanks is enabled the unit has unlimited ammunition and never needs to be reload.
- Stoppages should normally be off, stoppages on means the gaming gun will randomly jam while firing, the likelihood of a jam is determined by the weapon emulation selected.
- Damage should normally be disabled, if on when a gaming gun is killed the display will use the UK military code
- Select the muzzle flash colour (white is standard; however you can also select red or blue (blue will flash green on green installed predator LED's).
- Select hit light colour (select red, blue, or none)
- Select recoil: Normal allows recoil, red dot disappearing when shooting to be based on the recoil value of the current weapon emulations except in easy mode. If recoil is disabled, the red dot remains on even when shooting: If recoil is enabled then the red dot will disappear even in easy mode.
- Select range (outdoor or indoor). We recommend outdoor mode unless you are playing in a tight indoor space. Indoor mode greatly reduces the infrared range.
- Use Default[2] range normally, the system will pick up the range from the weapon emulation, however you can override the weapon's normal range here.
- Warning sound ON/Voice Feedback ON will on a standard gaming gun play the feedback and on a battle box play the time warnings at 1, 30seconds and 15 seconds to go.
- Select sound volume, usually leave on HIGH
- Lock Out: When enabled, this mode locks all the settings so when the gaming gun is rebooted it bypasses all the menus and goes straight to ready state, ideal for a rental business. The easiest way to exit locked mode is to hit the gaming gun with a SET UNLOCKED (IR) command found in the settings menu of a master controller, alternatively turn the unit on, push the left button 10 times then the right button 10 times and turn off/on with the key. If a unit is locked, the next menu option is Spare Device, if this is enabled a menu of devices suitable for a rental business is displayed.

1.4   In-Game Functions

The left button reloads the gaming gun [LEFT = LOAD]. If the weapon selected supports it, the right button changes fire mode from fully automatic or burst fire to semi-automatic.

---

[1] If the language setting is "Laser tag", then the LCD will say "Phaser Reset"
[2] The range setting is ignored when Indoor mode is selected

1.5   Reading the Display

This guide explains how to read the gaming gun display while in the "ready" state.

Normal Display	Laser Tag Display	Meaning
HP x/y	HP x/y	**HP is short for hit points** and is a measure of "Health". The digit/s before the '/' is the current hit points and the digits after the '/' is the hit points at game start or after a re-spawn.
A x/y	C x/y	**A is short for ammunition**. Before the '/' is the ammunition left in the current magazine and after the '/' is the capacity of the magazine. **C is short for charge**. In Laser Tag games the weapon is assumed to be some form of Laser unit powered by batteries.
R x/y OR R UNLIM	R x/y OR R UNLIM	**R is short for reloads**. Before the '/' is the number of reloads remaining. After the '/' is the number of reloads at game start, after receiving a reload from a master controller or ammunition box or after a re-spawn. **R UNLIM is short for unlimited reloads**. When the gaming gun is set to "easy" mode, then it gives the player unlimited reloads. And the gaming gun reloads automatically.
H	T	**H is short for hits**. This is the number of hits made on an opponent during this simulation that did not cause the target to "die". **T is short for tags**. The number of tags in this game on an opponent that did not cause a deactivation.
K	D	**K is short for kills**. This is the number of times this gaming gun made the hit that caused the target unit to enter dead state during the simulation. **D is short for deactivations** during the simulation. This is the number of opponents the gaming gun has deactivated during this game.
A xxx%	A xxx%	**A is short for Accuracy percentage**. For example if you fire twice and hit once then you'll have an accuracy of 50%.
S	S	**S is short for spawns**. It is the number of times this unit was re-spawned or in laser tag mode, reactivated during this game.
Ind	Ind	**Indoor** range which is significantly shorter than short range. Used to reduce infrared bounce.
Sht	Sht	**Short** range

Med	Med	**Medium** range
Lng	Lng	**Long** range.
1X	1X	SATR enables up to four separate groups to play simultaneously without cross-fire. This stands for **battle 1** (or "game 1" in laser tag). The X indicates that is friendly fire on.
1A	1A	This stands for **battle 1** (or "game 1" in laser tag) with this gaming gun assigned to **team A**. Team A gaming guns cannot shoot other Team A units. Team A gaming guns can only shoot Team B.
2B	2B	This stands for **battle 2** (or "game 2" in laser tag) with this gaming gun assigned to **team B**.
Ready	Ready	This is the current **status**. Ready is in a live game but not currently performing any action
Firing	Tagging	**Shooting** the infrared beam at the target.
Reload	Chrgng	Currently **loading a new magazine** or in laser tag terms loading a new battery.
Empty	Empty	In weapons using BA mode, when a round is fired, the status changes to "Empty" until the right button is used to simulate working of the bolt.
Open Bolt	Open Bolt	In BA mode, after pushing the right button once, the bolt enter into open bolt state.
Close Bolt	Close Bolt	A unit in open bolt state to fire again, must have the bolt closed; this is done by pushing the right button again.
Wound	Tagged	In normal mode, this means an enemy has recently hit this gaming gun and is close to "death". In laser tag mode this means an opponent has recently tagged this phaser and is now close to being deactivated.
Paused	Paused	This gaming gun/phaser is in paused state and will need a resume command by radio or infrared to resume.
Resume	Resume	A paused gaming gun/phaser has recently received a resume command after being in paused state.
Game Over	Game Over	This unit has received an end game signal by radio from a master controller or if out of radio range has had the game timer reach zero.
Near Miss	Near Miss	This unit has recently been hit or tagged but hit points are still high.
FA	FA	Fully automatic.
SA	SA	Semi-automatic meaning one shot per trigger pull
BA	BA	Bolt Action meaning one shot per trigger pull and the right button must be pushed twice between each shot.
SS	SS	Single Shot: must be reloaded after each shot
RV	RV	Revolver simulation, similar to SA
AL	AL	Automatically loading handgun similar to SA
Jammed	Jammed	The gaming gun has been jammed with a master controller or random stoppages are enabled. Push the reload button to clear the stoppage.
K/D	K/D	This is the classic kill to death ratio. It is one of the statistics shown on screen at the end of a game. K is the number of kills made and D is the number of times this gaming gun has been killed. In laser tag terms this represents the

		ratio of deactivations made on opponents to the number of times this unit was deactivated.
A/W	A/W	This is the Assists to Wounds ratio. Where Assists are all hits and kills made by this gaming gun and Wounds are all the hits on this gaming gun including any wounds that caused the gaming gun to enter dead state.
Game Stats	Games Stats	When a gaming gun enters game over state the game stats screen is shown. It includes the total number of kills and hits made during the last game only plus the K/D and A/W ratios for the last game. The O stands for objectives which mean hitting the domination box causing your team to now be in control.
Session Stats	Session Stats	The session stats are an accumulated total of stats since this gaming gun was turned on with a key or the clear stats command was issued and received by this gaming gun. To see session stats, send the gaming gun to game over state with a master controller and then pull the trigger once. To view the main screen again, just pull the trigger once.
O	O	O is short for Objective (or for "Owned"). If the Domination Box is in use and the player shots the box causing the other team's timer to stop and the friendly team timer to start/restart that is worth one objective point. The O is only shown on the GAME STATS screen and only if O is greater than 0.

1.6 The statistics explained

Take a look at the image above. Each of the letters/numbers have a meaning, the screen changes depending on which gaming theme you choose.

Battlefield LIVE	Battlefield UNDEAD	Battlefield TAG (laser tag)
HP = hit points (in this case 5 out of 5)	HP = hit points	HP = hit points
A = ammo (in this case 50 out of 50)	A = ammo (in this case 50 out of 50)	A = ammo (in this case 50 out of 50)
R = reloads (in this case 4 out of 4, meaning the gamer can reload 4 times)	R = reloads (in this case 4 out of 4, meaning the gamer can reload 4 times)	R = reloads (in this case 4 out of 4, meaning the gamer can reload 4 times)
H = hits.	H = hits	T = Tags
K = kills.	K = Kills.	D = de-activations
S = spawns / re-spawns	S = spawns / re-spawns	S = spawns / de-activations
A100% = accuracy percentage	A100% = accuracy percentage	A100% = accuracy percentage

Say a gamer has 4 hit points, the first time you shoot them your opponent will hear a near-miss sound effect, like a bullet whizzing past, the second time you hit them they will hear an "OAUGH" or wound sound effect, hit 'em again and they'll hear another "OAUGH" and the last time you get 'em they will hear the "AAAAAARGH!" dead sound effect.

Different SATR guns are allocated different amounts of ammo depending on the weapon it is currently emulating.

The next section represents the gaming gun's current weapon's range:

- **Lng**: Long (Outdoors for machine guns and most rifles)
- **Med**: Medium (Outdoors for carbines and the personal defence weapons)
- **Sht**: Short (Outdoor for sub machine guns and pistols) or
- **Ind**: Indoor (All units operating in a tight indoor environment or around inflatable's, this range used by Zombies as they are assumed to have a short range attack).

The letters "FA" stands for Fully Auto, you can also have SA for semi-auto or BA for bolt action. The word "Reloading" on the display indicates the gun is currently in the process of reloading.

1.6.1 The Display Screen Basics (Laser Tag Theme[3])

HP = Health Points 5/5
C = Charge[4] 25/25
R = Reloads 4 out of 4

3 ... e Language to Laser Tag
... e used here.

[USER GUIDE FOR SATR CODE V2.4C+]

T = Tagged (counts how many they have Tagged)
D = Deactivated (count how many they have deactivated)
A 100% = Accuracy %
S= Zero re-spawns/re-activations
SHT = Short Range (this could be medium or long as well)
1b = Game 1, Team b (this could be 1a; meaning Team a)
Ready = Status of the phaser (this can be tagging, game over, deactivated)
SA = Semi-Automatic (this could also read FA = Fully Automatic)

At the end of a game players can see their game statistics, see an example below.

In "O" for objective is the number of times this player has hit the domination box and caused the control to change.

2   SATR System – An Overview

SATR is short for Small Arms Transmitter/Receiver. SATR is an electronic system used for the live action combat simulation for entertainment. SATR is purposely designed to be configurable to be suitable for "Laser Tag" style games all the way up to realistic training programs for the military.

Each SATR unit is capable of acting in various modes. The options include:

- Weapon
- Master controller
- Combination Box
- Medic Box
- Ammunition Box
- Armor box
- Cure Box
- Weapon Box
- Mystery Box
- Domination Box
- Mine, and
- Radio Repeater.

This manual applies only to SATR code versions 2.2f and later. A separate guide is available for earlier versions of code.

The Battlefield Sports SATR supports a Laser Tag theme that can be used instead of the normal military theme. With the Laser Tag theme the terms used changes and some alternative functionality is available. Changing the Language setting to Laser Tag changes the theme.

2.1 Key SATR Features

- Software support for 69 different small arms including a range of hand guns, sub machine guns, rifles and machine guns
- Real time hit feedback
- Real time on gun individual performance statistics
- Back lit LCD display (back lit controlled by a special button)
- Radio control system to help staff manage the games
- Three difficulty levels
- Automatic re-spawn counting
- Indoor support (lower infrared power)
- Removing of friendly fire (optional)
- Smart medic and ammunition boxes
- Three mine modes.
- Laser Tag settings (when the language selection is "Laser Tag")
- Integrated support for Zombie and Domination style games.
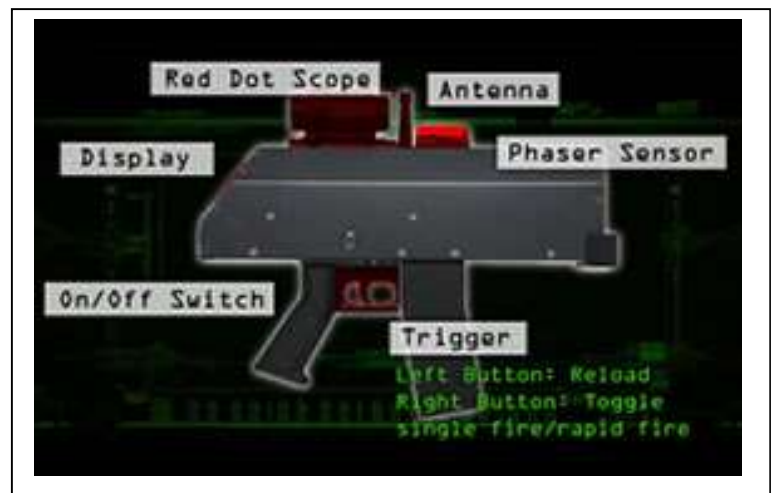
2.2 Factory Default Settings

Unless otherwise stipulated at the time of order, the factory default settings are:

- Difficulty: Standard
- Range: Default
- Mode: Outdoor
- Battle: 1
- Friendly Fire: On (i.e. no teams)
- Muzzle flash color: White
- Voice feedback: on
- Volume: high
- Language: American Female English (unless you've specified an alternate language).

2.3 What's New in SATR 2.0

The new 2.0 release of the SATR firmware and sound effects has a number of cool new features:

FEATURE	DESCRIPTION
Mystery Box	A mystery box causes the gaming gun to receive a new random weapon emulation. The box can be set to provide a new random weapon emulation from within the current gun class or a random emulation from all 69 different weapon emulations. Changes made to the emulation are temporary and are not retained between mission starts.
Domination Box	In Laser Tag language setting, the domination box will now say if announcements are enabled, "Red team in control" and "Blue team in control". 2.0 has the featured introduced in 1.6.5 code the enable the box to announce which team is in charge at regular intervals.
Master Controller sub menus	The master controller commands have now been moved into sub menus split into the categories of IR Commands, RF Commands, Settings and Testing.
Cure Box	This cures the infection of a survivor. Infections happen when a survivor is hit by a Zombie and the Survivor is in Apocalypse mode. A cure will also stun a Zombie.
Armor Box	Provides new maximum hit points which also results in the current hit points being changed. Typically an armor box provides an extra couple of hit points simulating the addition of body armor.
Team setting in Locked mode	A master controller in Lock Mode, will now allow the user to change the team settings.
Weapon Box	The idea of the weapon box is when the players reach a box, they can upgrade their weapon emulation. What weapon they get is specified by the directing staff before the mission starts.
Code Version	The version number of software code loaded is now shown on the boot screen of all devices e.g. SATR 2.2f
Domination Box control SFX	Each team now has a different sound effect indicating that the player has captured the domination box.
Master Controller->Gun Class	The master controller can now change the gun class of all target gaming guns.

Master Controller->Language	The language of target gaming guns can now be configured with a master controller
Master Controller->Indoor/Outdoor	To ease transition from indoor to outdoor play and back again, the master controller now allows the indoor/outdoor modes to be set.
Master Controller -> Mystery	The master controller can issue a mystery command just like a mystery box.
Master Controller -> Set Theme	The master controller can be used to set the theme of the target devices such as normal, haunted and apocalypse. The latter two are Zombie game options. Access through the Settings->Zombie Sub Menu.
Master Controller -> Rent Zombie (IR)	A standard set of configuration values suitable for renting out a Zombie game pack especially for the Zombie Kill Zone mission. This will lock the gaming gun. Zombies have 2 hit points with a red muzzle flash and hit light. Because this option can be used for rental, this command puts the target units into locked mode.
Master Controller -> Rent Survivor	Locks the gaming guns and sets the configuration into a suitable set of values for renting out a Zombie pack. The Survivors do not turn into Zombies when they die. The settings are for the Zombie Kill Zone mission so the hit points are set to 10 and the Survivors receive a fast reloading H&K G36 weapon emulation. Zombie Kill Zone assumes the survivors do not receive any respawns.
Master Controller -> Norm Zombie	Normal Zombie settings. This is a typical set of configuration values for running a field based Zombie game. Normal Zombies have a red hit light and red muzzle flash and have 4 hit points while a Zombie. Being a Zombie this command sets the target units to the B team. Normal Zombie is designed to run the Zombie Survival mission.
Master Controller -> Norm Survivor	Normal Survivor settings. This is a typical set of configuration values for running a field based Zombie game especially the Zombie Survival mission. This is haunted theme, so if a Survivor dies and respawns, they turn into a Zombie! To run the more advanced version of the Zombie Survival mission change the theme with the "Set Theme" command to "Apocalypse". Survivors start with a Dragonov SVD semi-automatic rifle with a blue muzzle flash and blue hit light. They get 5 hit points to start with, but in the Zombie Survival game, if they can get to the police station they can get extra hit points.
Set Zombie Hit Points from the Master Controller	The master controller can set with infrared communication the number of hit points the gaming gun gets when set as a Zombie.
Master Controller -> Zmbe SFX ON/Off	These functions turn on or off the random sound effects that Zombies make every 30 seconds.
Set/Chg weapons	Weapon emulation settings on the master controller are now retained between boots.

[USER GUIDE FOR SATR CODE V2.4C+]

2.3.1 New Language: Arcade

SATR 2.2F+ code now has Arcade language. Arcade language plays sound effects instead of spoken words and therefore is language independent. Arcade language has sound effects consistent with classic fast action arcade games. Emphasis with Arcade language is on fun.

2.3.2 New Team Settings

The new team settings enable Battlefield Operators to play the Domination Game or Team Death Match with friendly fire on, but the medic boxes set to teams. The Domination Box will also record team domination times, but instead of the usual game-play of friendly fire off, you can play with friendly fire on. This makes the game-play much harder!

The label "Team X" is no longer used in SATR2. Rather this is either "Team b" on a gaming gun or "Any Team" on other types of units.

See this table below for all the options for team settings.
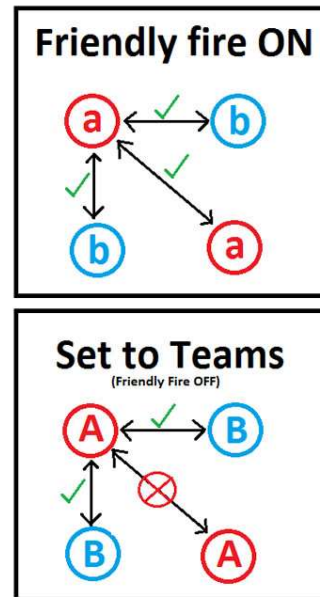
Team Letter	Effect
A	"Team A" is friendly fire off. So any gaming gun set to "Team A" or "team a" will not affect this gaming gun. Only devices (any unit other than gaming guns, such as a medic box) set to "Any Team" or "Team A" will work on this gaming gun.
B	"Team B" friendly fire off. So any gaming gun set to "Team B" or "team b" will not affect this gaming gun. Only devices (any unit other than gaming guns, such as a medic box) set to "Any Team" or "Team B" will work on this gaming gun.
a	"Team a" is friendly fire on. A gaming gun with this setting can be shot by other "Team A" or "Team a" gaming guns. Only devices (any unit other than gaming guns, such as a medic box) set to "Any Team" or "Team A" will work on this gaming gun.
b	"Team b" is friendly fire on. A gaming gun with this setting can be shot by other "Team B" or "Team b" gaming guns. Only devices (any unit other than gaming guns, such as a medic box) set to "Any Team" or "Team B" will work on this gaming gun. **This is the factory default setting**.

It is recommend to have friendly fire off.

2.3.3 New Weapon Emulation: Honey Badger

The Honey Badger emulation has replaced the Pulse Rifle. The Honey Badger supports supersonic fire at long range, with normal muzzle flash and sound effects as well as subsonic mode.

Subsonic mode has short range and a less bright muzzle flash plus a quieter sound effect. The gamer can change mode by holding down the mode button while pushing the reload button.

Note: Each toggle does waste the current magazine.

2.3.4 New Independent Dom Box Timer

The Domination Box has an option on the uncommon menu for "Dom Box Type", this is to decide if the box should use the game timer from the master controller time synchronization pulses or use its own game timer.

The latter is a new feature where the domination box timer can be independently set, useful when the Domination Box is used with other systems including Airsoft or paintball games.

2.3.5 HC SD CARD Support

From SATR 2.4c+ code, the SanDisk 8gb Ultra 40MB/s SD card is now supported.

2.3.6 Simple Controller

With a master that is in locked mode, a confirm is no longer required on the START (Radio) and END (Radio) commands.

2.4 Backward Compatibility

Battlefield Sports recommends that on each battlefield only one code version is used on all devices.

Version 2.2f+ is generally compatible with the previous production version 2.0y. The main change is the master controller set team function to team X is no longer supported since team X does not exist in 2.2f+ code having been replaced by team b (friendly fire on). A master controller with 2.2f+ code change weapons command is not compatible 2.0y code.

On a battlefield with 2.0 series code and 2.2 series code the master controller set teams will work on all gaming guns for team A and team B. Upper case A and B friendly fire is OFF, that is team A gaming guns cannot shoot other team A gaming guns. To run a "Free for All" game, the easiest option is to target reset all gaming guns, this will cause 2.2f gaming gun to change to lower case b (friendly fire on) and 2.0 series gaming guns to go to team X (friendly fire ON). Without using the Target Reset command (which sets everything back to factory default except language), you can have one master controller on 2.0 series code and another one on 2.2f code and shoot all target gaming guns set team option with both controllers.   The 2.0 controller set FF on and 2.2f controller set team b FF on.

[USER GUIDE FOR SATR CODE V2.4C+]

Version 2.2f+ is partially compatible with 1.x series code. It is recommended that all devices are upgraded to 2.2f+ code starting with the master controllers and battle boxes and then all the gaming guns. It is further recommended that any current users of 2.0u code upgrade to 2.2f or later code to receive the bug fixes.

A 2.0 master controller **Pause IR** and **Resume IR** commands will not work on gaming guns with any release of 1.x series code. All new features in SATR 2.0+ code will not work with gaming guns on 1.6a code.

When using a 1.6a master controller with target gaming guns on 2.x+ the following functions will not work **Pause IR, Resume IR** and **Set/Chg Weapons.**

2.5 Master Controller Mode

The Master Controller has 4 options from the main menu

Menu	Description
IR Commands	Commands issued by the master controller to other devices such as gaming guns by infrared transmission. The operator needs to point at the target device's sensors and then pull the trigger on the master controller. IR Commands in this menu do not make permanent changes to the target devices configuration.
RF Commands	Commands issued by digital radio to all devices on the same battle as the master controller. Especially start, end and pause game.
Settings	These are commands issued by infrared transmission that change the configuration of the target devices permanently. Permanently means the changes will be kept between reboots.
Devices	Test the IR/RF work without affecting the operation of the gaming guns and interrogate to gain key statistics data from the target device.

To scroll through the main menu use the red (reload) or black (mode) buttons, the drill down into the sub menu pull the trigger. When you enter a sub menu the screen will say "<< Main Menu", you can return to the main menu by pulling the trigger, to go through the list of options in the sub menu use the red or black buttons.

The Master Controller can perform both infrared & radio functions:

IR Commands **Infrared** (direct line of fire – target a single unit)

If the trigger is pulled on "<< MAIN MENU" the master controller returns to the main menu, push the reload button to scroll through the IR commands.

COMMAND	FUNCTION
Spawn	Target gaming gun is re-spawned if they were in dead state
Reload	Target gaming gun that has used at least 1 magazine of ammunition will have all their ammunition restored.
Pause	Target gaming gun enters into a pause state.
Resume	Target gaming gun in pause state returns to normal operations.
Kill	Target gaming gun immediately enters dead state.
New Mission	Target gaming gun starts a new game restoring all health, ammunition and resetting all statistical information. This is useful if you have send a "game start" command via RF to the entire group and one unit didn't start.
Mystery-Class	Target gaming guns temporarily randomly change weapon emulation from the list of weapon emulations for the current gun class.
Mystery-Rand	Target gaming guns temporarily randomly change weapon emulation. The emulation can be any of the 69 weapon emulations in the SATR system.
Jam Weapon	Any target gaming guns become jammed.
Shoot	Target gaming gun has their hit points reduced by 1.
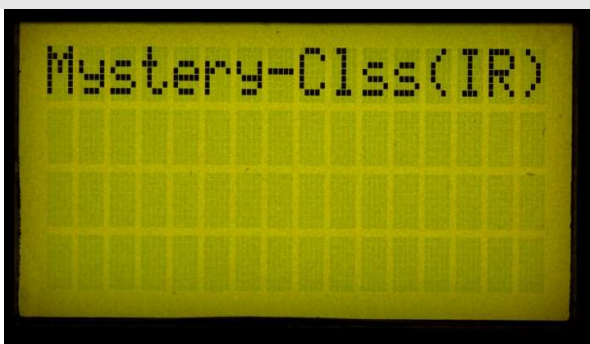
[USER GUIDE FOR SATR CODE V2.4C+]

On the master controller, the new mystery class

RF Commands
Radio commands affect all SATR units configured to the same battle group (or game group).

COMMAND	FUNCTION
Pause (Radio)	Sends all devices on the same battle as the master controller into Pause mode. Very useful after you have issued the gaming guns turned on for the players to use before the briefing, to then Pause the game before the briefing starts.
Resume (Radio)	Returns any paused devices to normal function.
End (Radio)	Sends all devices into game over state. For gaming guns in weapon mode, this will bring up the game stats which show all the statistics from the last game.
Start (Radio)	Starts a new game for any devices currently in paused or game over state. Has no effect on gaming guns in ready state. If a timed game is indicated in the settings, a Start (Radio) command will start the timer. When the timer reaches 0, all devices on the same battle will enter game over state.
Clr Stats (Radio)	Clear all the player stats that have accumulated, very useful at the beginning of each session as an alternative to resetting all stats by key on/off

Settings

COMMAND	FUNCTION
Set Team	This function allows to the teams to be set to team A or team B by infrared command. Gaming guns on team A cannot be hit by gaming guns on their own team. Team A units can only hit Team B. Do not mix friendly fire on with team settings – all gaming guns should be set to a team or all gaming guns should have friendly fire on. Generally for civilian use and CQB[5], Battlefield Sports recommends that friendly fire is turned off by assigning gaming guns to a team.
Target Reset	Reset all factory default settings except language to target gaming guns. This function is often used at the beginning of a session to ensure all gaming guns are on the same battle as the master controller and have a working set of default values. Make sure you don't target reset you battle boxes or any other non-gaming gun device. A target reset will set the gaming guns to Friendly Fire On
Set/Chg Weapons	Step 1: Specify what weapon emulation in each gun class (Hand guns, Sub machine guns, Rifles and machine guns) you want to use.
Step 2: Then use the Chg Weapons command and shoot the master controller towards the gaming guns to change their

---

[5] Close Quarters Battles

	weapon emulation to match the one you just specified on your master controller. .
SET/CHG class	Changes the gun class of target gaming guns, choices are Handgun, Sub machine gun, Rifle, Machinegun.
Zombie Sub Menu	Access to the Zombie game related IR commands.
Set Health/Ch Hth	Set the target gaming gun to a new maximum hit point level.
Set Difficulty	Updates the difficultly level of the target gaming gun including setting the hit points to the default value of the specified difficulty level.
Set Indoor	Any target devices will change to indoor mode.
Set Outdoor	Any target devices will change to outdoor mode.
Set Locked	Any target devices will change to locked mode. Locked mode means the device will boot straight to ready bypassing the configuration menus thereby locking the users out of the menu system. Locked mode on a master controller will cause the master controller to only have a very limited set of command options.
Set Unlocked	Exits target devices from locked mode so that on reboot with the key, the menus can be accessed.
Set Volume/Chg Volume	Changes the target gaming guns volume
Colors Menu	Access to a sub menu of options relating to setting muzzle flash and hit light colors.
Set/Chg Language	Specifies what language the target devices should be operating in.
SET Gun Time	This command sets an individual timer to target gaming guns. This means a particular gamer can have a certain amount of game time before their gaming guns enters game over state.
Set Game Timer	Specifies the number of minutes the battle will run for from the time the start function is used before the gaming guns automatically enter the game over state.
Set Battle	A gaming gun will only accept radio commands, accept hits and hit others if they are all in the same Battle group (or game group if you are using the Laser Tag settings). This function means separate battles can be played in close proximity to each other without them affecting other groups.

Devices sub menu

COMMAND	FUNCTION
Test RF	This is quick test option on the field to test the infrared sensors are working and the digital radio system is transmitting.
Interrogate	Shoot at a target gaming gun to retrieve key statistics about it.

[USER GUIDE FOR SATR CODE V2.4C+]

Zombie Sub menu
This is accessed through settings on the master controller.

COMMAND	FUNCTION
Zombie Theme	**Normal Theme**: this is a non zombie game **Haunted Theme**: This is a Zombie game where if a Survivor dies & takes a respawns, they turn into a Zombie. The B team is the Zombie team & A team is the Survivors. **Apocalypse Theme**: This works like the Haunted theme, however Survivors can now be infected & die from the infection. Survivors when they first die automatically resurrect as a Zombie!
Rent Zombie	Sets Target gaming guns to the haunted theme and puts them in locked mode. This is designed for when the equipment is rented out rather than for professionally run events. The Zombies have a red muzzle flash and red hit light with 2HP. Zombies are always on indoor range as they have a short range attack. The sound volume is reduced to medium.
Rent Survvr	Sets the gaming guns to normal theme. In the rental package, the survivor gaming guns **do not turn into zombies**. Survivors receive a rifle configured as an H&K G36 and receive 10 hit points. Generally they don't receive any respawns, the idea being to kill as many Zombies as possible before succumbing. The gaming guns are locked.
Norm Zombie	Sets the target gaming into a configuration suitable for running commercial Zombie games. Zombies receive 4 hit points and operate on indoor range. They have a red muzzle flash if they shoot, however Zombies get an automatic silent attack every second without muzzle flash!
Norm Survvr	This sets the target unit to haunted theme as a Survivor. Survivors have a blue muzzle flash & blue hit light. Survivors start with 5HP.
Set Zombie HP	Sets the number of hit points a Zombie gets.
Zmbe SFX On/Off	Turns on or off the special zombie sound effects that play when a gaming gun is in Zombie mode.

Colours sub menu

COMMAND	FUNCTION
ANY HIT RED (IR)	Sets the hit light to red
ANY HIT BLUE (IR)	Sets the hit light to blue
ANY HIT OFF (IR)	No hit light when hit but not killed. Dead state will show red hit light
ANY MUZ RED (IR)	Sets the muzzle flash to red.
ANY MUZ BLUE (IR)	Sets the muzzle flash to blue.
ANY MUZ WHTE (IR)	Sets the muzzle flash to white.
ANY MUZ OFF (IR)	No muzzle flash
Defaults 1	Any A team gaming gun set to red muzzle, red hit light. Any B team gaming gun set to blue muzzle, blue hit light
Defaults 2	Any A team gaming gun set to blue muzzle, blue hit light. Any B team gaming gun set to red muzzle, red hit light

Master Controller with Laser Tag Language
The SATR display changes terminology when the Laser Tag language option is selected. With a master controller, two additional commands are added to the Settings sub menu on a master controller with the master controller is set via the boot menus to the Laser tag language option.

Please note: Instead of gaming guns we use the word phaser.

New Laser Tag Commands

COMMAND	FUNCTION
Set Blu Team	Resets the target phaser back to a working set of defaults suitable for laser tag themed games. It also sets the phaser to team B. All phasers will be configured to easy mode and medium range with a blue muzzle flash and blue hit light. A special weapon emulation is enabled which acts like a Scorpion but has a 50round magazine. **This command will also lock the target phaser into lock mode. In lock (hire) mode if the unit is turned on with a key, it boots straight to ready state bypassing all the menus. It will require a target reset or turning on with the key and pushing the left button 10 times and the right button 10 times then turn off and on to get back to the configuration menus.**
Set Red Team	Resets the target phaser back to a working set of defaults suitable for laser tag themed games. It also sets the phaser to team A and the hit light and muzzle flash will be red. Sets unit to locked mode.

Revised terminology

TERM	Battlefield LIVE equivalent	DEFINITION
Charge	Reload	Does a virtual recharge of all spent "batteries".
Deactivate	Kill	Target phasers are deactivated
DeActvtes	Kills	The number of deactivations made by the master controller
Large Phaser	Machinegun	
Medium Phaser	Rifle	
Phaser	Gaming Gun	This is the Laser Tag version of Gaming Gun.
Reactivate	Respawn	Brings a deactivated phaser back into the game.
Reactivates	Respawns	Number of phasers brought back to ready state from deactivated state by the master controller
Set Phasers	Set Weapons	Set what weapon emulations will be used by class during a CHG phasers command
Small Phaser	Submachinegun	
Tag	Shoot	Means to tag a target phaser which reduces their hit points by 1.
Tiny Phaser	Handgun	

3   SATR – Standard Playing Unit

3.1 On Boot Test

If the reload button is held down during the initial boot, the system enters into a special test mode. This is for testing by the technicians after a repair or as part of the final quality assurance test at the factory. This is for testing the muzzle flash LED's, hit light LED's and radio system. To test the LED's scroll through them using the reload button. To test the RF set up a battle box using the trigger switch to RF Test Mode RX and the unit to be tested RF Text Mode TX.

3.2 Boot Sequence
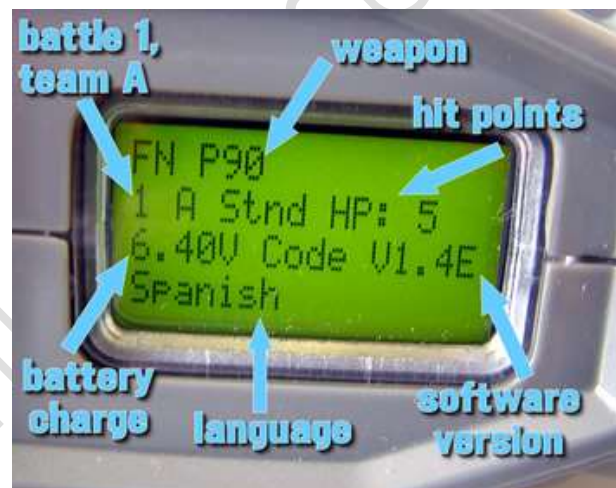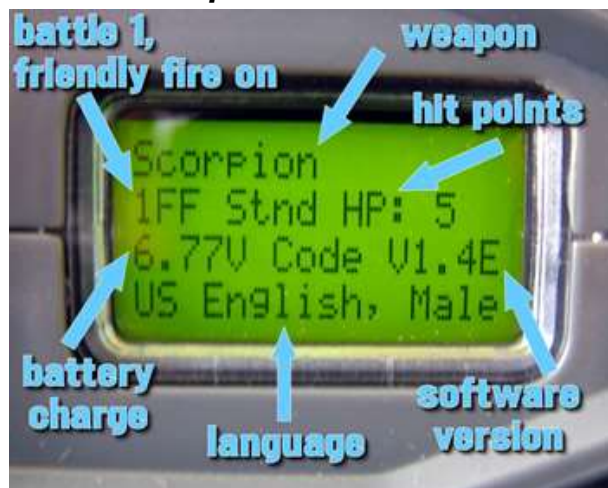
The SATR unit is turned on and off using a switch operated by a key. Upon boot there are 3 options available to the user:

1. **Pull trigger**: Commence a few second count down to use the last configuration
2. **Push left (red) button**: Go to menu for selecting difficulty level, weapon emulation, reloads, health, and language.
3. **Push right (black) button**: Go to menu for selecting device role (weapon mode, weapon box, domination box, combination box, mystery box, medic box, ammunition box, claymore mine, normal mine and dirty mine), theme, gun class, muzzle flash, hit light color, battle, indoor/outdoor mode, voice feedback status, Master Controller mode on/off, volume.

During the boot sequence the back light on the display is automatically turned on until the 3 second count down commences. The back light is also on when the SATR unit is used in controller mode. During a ready state, the back light will only come on after pressing the right button.

3.3 Menu Scroll and Select

All menus in SATR operate in the same manner. Press the left (red) button to scroll *down* to the list of options. The right (black) button is used to scroll *up* the list of options. The trigger is used to select the current option.

3.4 Reload (left/red) Button Menus

SELECT DIFFICUTLY LEVEL

On pressing the reload button, the menu to select the difficulty level comes up. Scroll using the left or right buttons to select a difficulty level and then pull the trigger to lock in the selection.

Difficulty Level	Unlimited Reloads	Minimum Time between hits (seconds)	Automatic Reload	Default Health (hit points)	Recoil[6] (turn off scope power)
Easy	Yes	2	Yes	5	No
Standard	No	1	No	5	Yes
Hard	No	0.5	No	3	Yes

SELECT WEAPON

After selecting the difficulty level, the selection of available weapons for the current gun class is listed. To change the gun class, press the right (black) button on initial boot must be used.

As the user scrolls through the list, a verbal description of the weapon is played explaining the weapon and its capabilities. A full description of each weapon is available in the appendix.

"Rels" is the default number of reloads

"Mag" is the magazine capacity of the weapon.

SET RELOADS

The default number of ammunition reloads is determined by the weapon selected in the previous step. But you can override this and set the number of reloads.

---

[6] If recoil is set to NORMAL.

[USER GUIDE FOR SATR CODE V2.4C+]

SET HEALTH

Health is measured by a hit point system. Each time a gamer takes a hit, the number of hit points is reduced by 1. The lower the initial health value is, the more realistic and harder the simulation is. For beginners, Battlefield Sports recommends 5 hits (hit points) and for advanced gamers, between 2 and 3 hit points works best.

SELECT LANGUAGE

A language can be chosen for the in game spoken sound effects.

The languages available are:

1. US English – Female (*this is the factory default, unless otherwise stipulated*)
2. US English – Male
3. British English – British
4. Arabic
5. Mandarin
6. Deutche (German)
7. French
8. Italian
9. Japanese
10. Portuguese
11. Russian
12. Spanish

13. Arcade[7]
14. Laser Tag US English-Female (changes voice sounds and display settings to Laser Tag)
15. Custom (*you can have your own language, you will just need to provide us certain sound files when you order, i.e. 11khz 8 bit mono wav file format please contact us if you would like this option*).

The Laser Tag sound scheme is for those operators that need something tamer than the normal spoken sound effects.

Usually the Laser Tag sound scheme is used in conjunctions with the Scorpion weapon emulation. Laser Tag sound effects say "Tagged", "De-activated", "De-activated Already", "Game Start" and "Game Over" in US female English.

The display also changes in ready mode to have T for tags (hits), and D for deactivations (kills).

The Domination box will say "Red Team is in control" or "Blue team is in control".

Custom file name on SD card	Sound
NOAMMO.WAV	Ammunition Depleted
DEAD.WAV	Dead Already
HIT.WAV	Casualty
KILL.WAV	Kill Confirmed
COMPLETE.WAV	Mission Complete
START.WAV	Mission Start
PAUSED.WAV	Paused
RELOADED	Reloaded
RESPAWN	Re-spawned
CONTINUE.WAV	Resumed

3.5 Mode (RIGHT/black) Button Menus

This series of menus is entered after initial boot with key switch and pushing the mode switch found on the right hand side of the SATR unit.

GUN RESET/PHASER RESET
To set a gaming gun back to factory default settings for the current gun class, then use this option to do so.

Push the left button and then pull the trigger to reset to defaults. This will not change the gun class.

DEVICE ROLE
This determines if this SATR unit should act as a Master Controller, mine, medic box, ammunition box or a standard weapon.

---

[7] The Arcade language scheme uses sound effects associated with classical arcade games to indicate hits, kills, respawns etc. Arcade language scheme since it does not use spoken phrases is language independent.

[USER GUIDE FOR SATR CODE V2.4C+]

SELECTION	EFFECT
Weapon Mode	Means this gaming gun acts like a normal weapon for a gamer.
Ammunition Box	Unit will boot in reload mode each time the trigger is then pulled in a game, it will perform the Master Controller function of "Reload". When set to an Ammunition Box the unit can be configured to perform a specified number of reloads or reload for a specified time.
Medic Box	Unit will boot in respawn mode, If the medic box is assigned to a team it will only re-spawn that team. When in ready state, the reload and mode buttons are disabled. A gamer re-spawns by pushing the main trigger button on the unit while ensuring the sensor can be hit by the infrared beam. It also resets the respawn counter on the RF "game end" and "game start" function. While in live state, the reload and mode buttons are disabled. Medic boxes can be configured to perform a specified number of spawns or spawn for a specified period of time. A RF end/start sequence will restart these counters. In timed games, with voice feedback turned on, a medic box will provide an audible warning at the 1 minute, 30 seconds and 15 seconds to go marks.
Combo Box	This mode combines the functionality of a medic box and an ammunition box. The left reload button generates a reload command and the trigger button generates a spawn. The right button remains disabled.
Controller	Standard Master Controller formerly known as a referee gun.
Claymore Mine	Designed for claymore mine case. A claymore in this mine will use the kill mode causing the target gaming gun to reduce to 0 hit points immediately.
Normal Mine	Claymore mine that only causes 1 hit per explosion
Dirty Mine	Using shoot signal from claymore but shoots continuously for 22 seconds.
Radio Repeater	This mode is designed to repeat the radio signals from a master controller. The signals repeated are pause,

	resume, start and end. A device configured as a radio repeater should be placed at the highest point of the field ideally in a tower with minimal amount of line of sight blocking objects.
Domination Box	The domination box support Domination style live plays where the objective is to control/dominate an area for as much time as possible. The domination box keeps track of how much time each team was in control. Depending on the option chosen by the CO, A domination can be triggered by shooting the box or by pushing a button. The red button is used for team A and the blue button for team B. While a team is on control the hit lights flash indicating control, a red flash means the A team is in control and the blue flash means the B team is in control. When the game ends, the Domination box will say which team has won and by how much. The team that won the game when the game end is also indicated by the colour of the flashing hit light, Red for the A team and Blue for the B team.
Mystery Box	The mystery box is designed to give gamers a new weapon emulation that is randomly selected when they trigger the box by pushing the trigger button on the box and pointing a sensor at the top of the box. There are two basic options called "Stay in class" and "Any weapon avail". "Stay in class" means that the gun class will not change, but new random weapon emulation with that gun class will be loaded into the gamers gun. "Any weapon avail" will select a random weapon emulation from any gun class. Changes made by a mystery box to target gaming guns are only temporary.

Target gaming guns can receive new weapon emulation after waiting 90 seconds.

The number of times the mystery box can be successfully used can be configured. |
| **Armor Box** | The armor box is designed to allow gamers to upgrade their hit point value in the field by reaching the box. Generally the hit point value selected by the directing staff before the mission commences on the box is greater than the starting hit points. For example players may start with 5 hit points, but the armor box is set to 8 hit points, so if the players reach the armor box they can increase their current and maximum hit points by 3. |
| **Cure Box** | In a Zombie apocalypse game, survivors when hit by Zombies are infected. The more times they are hit, the faster the rate of infection.   The cure box is designed to cure the infection on a survivor.   Of course if the survivor is hit again by a Zombie, they will be infected again.   An infection generates a timer displayed on the Survivor's |

	gaming gun's LCD, when this reaches 0, the Survivor dies and will turn into a Zombie. The number of cures can be specified by the directing staff through the right mode button menu.

Follow on menu if medic box option is selected

SELECTION	EFFECT
Medic Box Type • **Unlimited Spawns/Unlimited ReAcvt** • **Time Limited** • **Limited Respawns/Limited ReActvts**	Unlimited means the medic box is perform re-spawns Time limited means the operator can specify how many minutes to perform re-spawns. Best to set this, perform an radio end game to set the medic box into game over state and then start the timer with the master controller Start (radio) function. Limited means setting a fixed number of re-spawns the medic box will perform before it will automatically stop.
Manual Spawn/Auto Fire Spawns	Manual Respawn means the player has to push the trigger button (normally green) on the medic or combination box to trigger a respawns. With Auto Fire Spawns, the medic or combination box transmits a respawns signal four times per second so the players do not need to use the trigger button.
Any Team	Can respawns gaming guns set to team A, Team B or Friendly fire ON.
Select Range • **Outdoor** • **Indoor**	Outdoor is the same as long range for a weapon and indoor is the same as indoor for a weapon.
Warning SND ON/OFF	Can be used to turn off the audible warnings when the game is close to finishing. In most cases we recommend you leave that on.
Battle Modes • **Any Team** • **Team B** • **Team A**	With any team, the medic box will perform spawns regardless of what team the gaming gun is set to. If gaming guns are assigned to a team, then it is best to assign the medic box to the same team. A medic box configured for team A can will not respawns gaming guns on team B.
Battle/Game X	It is important to assign a medic box to the same battle/game as the gaming guns and master controller that will be used for this game. The Battle/Game value is used to isolate one battle from another so they don't interfere with each other.

Follow on menu if a **Mine** option is chosen

SELECTION	EFFECT
Multi Mine Always Live	Mine rearms in 6 seconds automatically
Single Mine One fire only	Once fired must be reset before it can fire again. A mission end/mission start by RF will rearm the mine.
Regen Mine 2.5min Reload	Mine rearms in 150 seconds automatically
Trigger Mine Shoot to Fire	The mine can be triggered if the sensor on the claymore is hit by any gaming gun.
Suicide Vest	This is a special claymore mode that lets the unit act as a suicide vest. The suicide vest can take hits like a normal gaming gun and the mine cannot be triggered if the gamer is killed.

Follow on menu if a **Weapon** followed by Zombie - **Haunted** option is chosen

SELECTION	EFFECT
Zombie HP	When a player becomes a Zombie this is how many hit points they will get.
Survivor/Zombie	A Survivor is a living human. A zombie is undead. Humans that die and then take a respawn are automatically turned into a Zombie.
Zombie Randm SFX	If enabled, the Zombie makes a spooky sound effect every 30 seconds.
Zombie Melee LED	If enabled, the infrared message will be transmitted through the head sensor. This head sensor must have the blue hit lights replaced with TSAL6100 infrared emitters for this function to work. If disabled, the Zombie will shoot through the main IR emitter (in the lens assembly) instead. Zombie Melee LED enabled is normally for dedicated Zombie boxes.

Follow on menu if a **Weapon** followed by Zombie - **Apocalypse** option is chosen

SELECTION	EFFECT
Zombie HP	When a player becomes a Zombie this is how many hit points they will get.
Zombie Infection Time per HP	This is how many minutes before the player dies of infection based on the current hit points. If the current infection time is less than would be the case based on the hit points immediately after being hit, the current infection time is retained.
Resurrection Time (Zombies)	After a Survivor dies, they automatically respawns as a Zombie after the number of minutes specified here. A respawns during the period from death to resurrection will restore full hit points but only temporarily stop the infection.

[USER GUIDE FOR SATR CODE V2.4C+]

Survivor/Zombie	A Survivor is a living human. A zombie is undead.
Zombie Randm SFX	If enabled, the Zombie makes a spooky sound effect every 30 seconds.

More about Zombies

In Zombie mode if enabled to do so, the Zombie makes a random Zombie sound effect approximately every 30 seconds unless disabled. Zombie attacks have no muzzle flash and are also set indoor range and they don't have a red dot, forcing Zombies to get in close. The Zombies do have the advantage that every second they automatically shoot with making any sound. Zombies can also receive respawns. If the trigger is pulled, the Zombie gun will fire with a sound effect but no muzzle flash.

Zombie are always on team B and the survivors are team A.   Using the change team function on the master controller can therefore swap a player from the Zombie team to the Survivor team and vice versa.

FRIENDLY FIRE

This option allows the operator to disable friendly fire if required. For commercial entertainment, Battlefield Sports highly recommends that the teams are set using the master controller and therefore eliminating friendly fire. Friendly Fire ON should only be used where there is low gamer to space ratio and the gamers are very experienced.

"Friendly fire ON" means that this SATR can accept hits from any SATR unit assigned to this battle.

"Team A" means this SATR unit will only accept hits from SATR units assigned to TEAM B and only if they are in the same battle. Therefore Team A gaming guns cannot hit this unit. With Zombie theme game, the **Survivors** are always on team A.

"Team B" means this SATR unit will only accept hits from SATR units assigned to TEAM A and only if they are in the same battle. Zombies are always on team B.

Warning: It is very important that in any single battle all gaming guns are set to a team or all gaming guns have friendly fire ON.

BATTLE/GAME

SATR is designed to allow one battle to be isolated from another battle so that radio and infrared messages between battles is prevented.   Four separate battles are supported. In Laser Tag mode this is called "Game" instead of Battle.

If using the standard settings you will see…	If using the "Laser Tag" theme you will see…
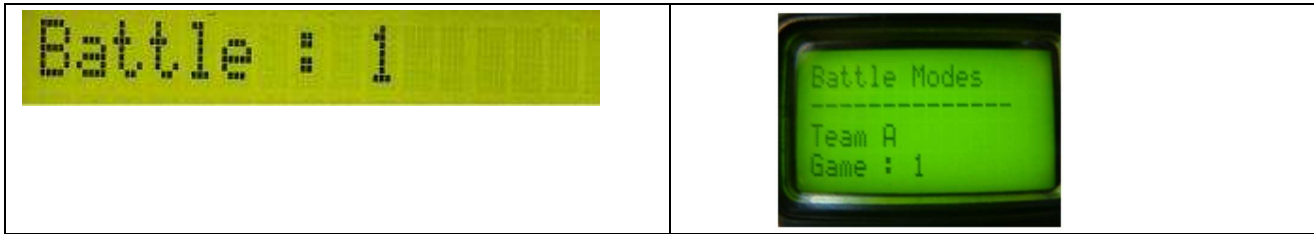
The Battle can also be set using a SATR unit working in Master Controller mode.

GUN CLASS
The gun class is used to specify the general class of weapon that this SATR unit has been installed on. It reflects the size, weight and general looks of the weapon so that only weapons from the same gun class can be selected in normal operation.

If using the standard settings you will see…	If using the "Laser Tag" theme you will see…
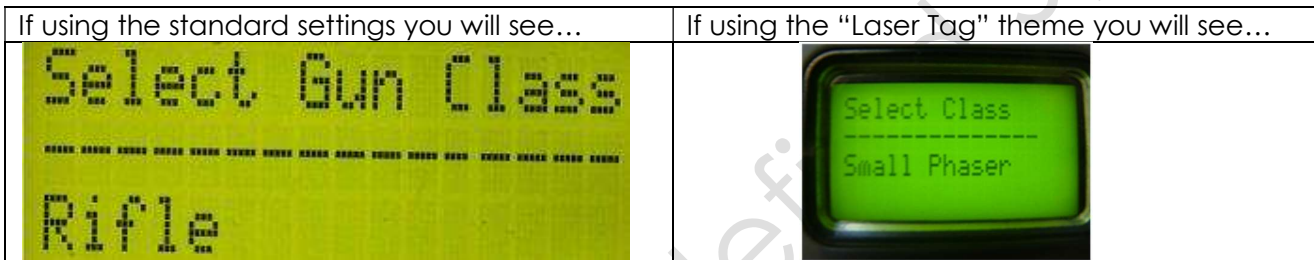
The machine gun class is assumed to be weapons on some sort of mounting such as a bipod or tripod or vehicle. The result is machine guns have a lower recoil value than many rifles.

There are 4 gun classes available including hand gun, rifle, sub machine gun and machine gun. The gun class can be changed using the master controller.

LASER TAG CLASS
When Laser Tag sound scheme is in effect, the classes change to Tiny Phaser, Small Phaser, Medium Phaser and Large Phaser. Here are the equivalent terms:

Tiny Phaser	Handgun
Small Phaser	Sub machine gun
Medium Phaser	Rifle
Large Phaser	Machinegun

[USER GUIDE FOR SATR CODE V2.4C+]

RECOMMENDED GUN CLASS BY MODEL

MODEL	RECOMMEND GUN CLASS	LASER TAG EQUIVALENT
Cobra	Submachine gun	Small Phaser
Scorpion	Submachine gun	Small Phaser
P90	Submachine gun	Small Phaser
Spitfire	Submachine gun	Small Phaser
Commando Carbine	Rifle or Machinegun	Medium or Large Phaser
Commando Sniper	Rifle	Medium Phaser
Morita	Machinegun	Large Phaser

FIRE MODE

SATR supports variable damage. You can select either a standard "shooting" or tagging mode; or a one-shot/one-kill mode.

Shooting/Tagging	This is the normal mode that means the target gaming gun hit points are reduced by 1 on each hit or tag.
Killing/De-Activating	In this mode a single hit or tag from the shooting gaming gun will cause the target unit to go into dead/deactivated state. Normally only used with high powered sniper rifle weapon emulations.

BLANKS

If SATR technology is installed on a blank firing weapon and the triggering the shot is controlled by the physical ammunition supply, it is not necessary or useful for SATR to control the magazine capacity.   If Blanks is ENABLED, then SATR will have unlimited ammunition and will count the number of rounds fired. In ready state, the top right hand side of the LCD will say "Fd" short for "Fired".

STOPPAGES

If ON, then the weapon will randomly jam.   The chance of jamming is based on the current weapon emulation and the mode of fire (fully automatic versus semi-automatic)

DAMAGE

If enabled, then when the trainee is killed, the location and severity of the wound is shown on the LCD display.   This option is really only for military use and should be disabled for civilian use.

MUZZLE FLASH

The muzzle flash is the forward facing LED's that flash when a gaming gun is firing. The colour of the flash is configurable. The default white is used usually as it tends to look the most realistic. However the red and blue options are sometimes used to distinguish teams at night, this is typically done in conjunction with setting the hit light to the same colour.

The default is white muzzle flash. The options are:
- White Muzzle Flash
- Red Muzzle Flash
- Blue Muzzle Flash
- No Muzzle Flash

[USER GUIDE FOR SATR CODE V2.4C+]

Even if a muzzle flash colour is selected, a SATR unit configured as an MP5 SD will still not generate a muzzle flash.

HIT LIGHT

The hit light is the LED that flashes in the sensor domes when a unit takes a hit and stays on while in dead state.

The default "No hit light" option results in no hit light showing when SATR is hit but does result in a red hit light when the unit is dead.   Because SATR has a radio hit feedback system, the hit light is unnecessary in many circumstances.

The other options are blue and red hit light.

RECOIL.

In SATR, the loss of accuracy that comes from firing automatic weapons after the 1st shot in a burst is simulated by temporarily switching off power to the red dot scope.   How long the scope is switched off depends on the recoil value of the current weapon emulation.

NORMAL: The red dot disappears each time the weapon shoots unless the difficulty level is easy.

ENABLED: Same as NORMAL except in EASY mode, the red dot does disappear.

DISABLED: The red dot comes on and stays on when shooting regardless of difficulty level.

RANGE: INDOOR/OUTDOOR

When operating a very close quarter's games typically of an indoor environment, the indoor option should be selected. The indoor option significantly reduces the power of the infrared beam. The purpose of range reduction is to minimize the level of infrared rebound sometimes known as IR bounce.   Setting indoor mode means the gaming gun will ignore the normal range for the specified weapon including range override.   Indoor range is even shorter than "short range".

When operating indoors Battlefield Sports recommends that all walls are painted matt black and we recommend that friendly fire is turned off by setting the teams.

RANGE OVER-RIDE

Every individual weapon simulated by SATR has a range specified for it. However the default range associated with the weapon are designed to create fair game balance between different model gaming guns. However if required, you can specify the range independently of the weapon emulation by using the "Select Range" menu item.

If the default range is selected, then the range used is the range of the weapon selected at the time of firing unless indoor mode is selected.

Legacy models

If SATR is installed in a unit with a short range 25mm lens such as a Spitfire made prior to 2009, the range over-ride should be used to force the long range while simulating a sub machine gun. A Spitfire configured as an UZI would normally be short range. But you may want to use the range over-ride, in other words when you boot up the Spitfire set it to long range. Otherwise its range will be ultra-short. Effectively double short range; one from the SATR electronics range reduction and one from the limitations of the short focal length on the 25mm lens.

VOICE FEEDBACK
Some gamers may prefer that the voice sound effects are turned off so they can be stealthier. Hit feedback is still provided by flashing the red dot scope twice when the gaming gun makes a hit and four times when it makes a kill. Battlefield Sports recommends that the voice feedback is set to ON for all gamers in all standard sessions for the public.

With a medic box, ammunition box and a master controller if the Warning SND is ON and a timed game is in operation each of these devices will make an audible warning with 1 minute, 30 seconds and 15 seconds to go.

SOUND VOLUME
For certain situations the volume of the SATR units needs to be reduced especially for indoor use or in public venues. There are three volume levels to choose from:
- High
- Medium or
- Low.
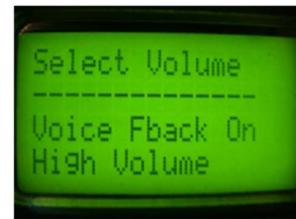
OPTION LOCKOUT

In some applications such as a rental business, there is a requirement to lock the users out from the on boot menu options.   In the lock out mode, a unit in weapon mode will boot directly to ready state bypassing the menus and therefore the user cannot change the configuration. In weapon mode, after selecting lock out, the unit can be further configured as a "Spare Device". The spare device will boot each time with a menu allowing the user to select from a list of preconfigured device roles suitable for rent such as "Red Team Phaser" or "Blue Team Medic Box".

A master controller set to lockout mode will only have a limited sub set of commands and does not use the sub menu system.   The commands are Spawn, Set Game Time, Set Volume, Set Team, Start (Radio), End (Radio) and New Mission.

3.6 Standard Playing Mode
Assuming the unit has not been configured to operate as a Master Controller, this is the mode of operation after the boot/menu selection sequence is complete.

3.6.1 Count Down/Save Configuration
Whenever SATR processes a re-spawn or starts a new game, it commences a 3 second count where the gamer cannot take any action but also cannot be hit by any other SATR unit.   After the 3 second count down is complete, the audio files loaded into memory. The result is to give a gamer approximately 4 seconds to move to a safer position.   By pulling the trigger the user can bypass the 3 second count down and go to audio file load immediately.

If a gaming gun is started with a radio message, the gaming goes immediately to ready.

The countdown also displays the current battle so that gamers can check their unit will work with the other units in the same battle.

3.6.2 Ready

Upon start up or whenever SATR is alive and is not performing another function like shooting, reloading or taking a hit, it goes into ready mode.

FIRING STATISTICS

Character	Meaning
H/T	Hits/Tags: Number of hits made on another SATR unit this game that did not result in a kill.
K/D	Kills/Deactivations: The number of hits made on another SATR unit this game that resulting in a kill (dead)
A	Accuracy: The number of hits including kills compared to number of rounds fired as a percentage

MODES OF FIRE

Mode of Fire	Description
FA	Fully Automatic
BF	Burst Fire – limited to 3 rounds per automatic burst
SA	Semi-Automatic
BA	Bolt Action
RV	Revolver
AL	Auto Loader (Pistol)
SS	Single Shot

3.6.3 Firing

From the ready state, a trigger pull will cause SATR to commence firing assuming there is ammunition left in the current magazine. For weapons with a BA mode of fire, the right button will need to be pushed after each shot before another shot can be fired.

Upon firing SATR will generate an infrared pulse for every round fired as well as a muzzle flash and appropriate shooting sound effect.

If the fire mode is FA, then SATR will keep firing while the trigger is pulled until it runs out of ammunition or receives an external event such as a hit. Technically in fully automatic fire only every 2nd shot actually generates an infrared packet, this allows sufficient time between packets when the beam is reflecting onto the shooter, for another gaming gun to hit the shooter.

If the fire mode is BF, SATR will fire up to 3 rounds with the trigger pulled. To continue firing the trigger must be released and then pulled again.

In all other modes of fire, after each shot the trigger must be released before another shot can be made.

If the SATR unit makes a hit on another SATR unit that does not result in a kill, the number of hits 'H" is incremented by 1. If SATR unit makes a hit that causes a kill, the number of kills 'K' is incremented by 1. Upon making a hit, a voice message in the selected language will be heard saying "Casualty". If a kill is made, a voice message in the selected language will be heard saying "Kill Confirmed". If the Laser Tag sound scheme is employed, then we have T for tags, D for deactivations and the sound effect for a tag is "Tagged" and for making the final tag it says "Deactivated"

If a SATR unit hits another SATR unit that is already in dead state, a voice message be heard saying "dead already" in the language selected.   The red dot will also flash once. If the Laser Tag sound scheme is used it will say "Deactivated already".

All such voice messages are produced by the firing SATR unit.

Each time a shot is fired which misses the target, the accuracy percentage will reduce (minimum of 0%) and each time a hit is made, the accuracy percentage will go up. Accuracy is rounded to the nearest whole number.

If the gaming gun has a recoil value greater than 1, then the red dot will be powered down immediately after it fires. The power down time is 0.5 seconds for each point over 1 of recoil associated with the current weapon, typically in the range of 0.5 to 1.5 seconds. Each shot fired re-starts the power down timer. This function does not occur on easy mode.

Because easy mode does not have the recoil simulation feature, it is the recommended mode for zeroing the scope.

The bolt action rifle requires manual working of the bolt after every shot. In SATR this is simulated by the operator having to push the mode button twice after each shot.

After a round is fired, the status changes to "Spent Case". After the first right button push the mode changes to "Open Bolt"

And then after the second button push the status will go back to "Ready".

3.6.4 Reload

While in the ready state, pushing and releasing the reload button (left side) will start the ammunition reload sequence assuming there are still reloads available. If the current magazine is full, the reload button is disabled.

While reloading SATR cannot shoot but can be hit by other SATR units. Taking a hit, while reloading slows down the reload process.

Once the reload process is complete, all the ammunition in the current magazine is restored to full.

3.6.5 Right Button

The right button during a live game is used to toggle between fully automatic or bust fire and semi-automatic fire. This mode does not perform any action on weapons that do not have secondary mode of fire. For example some machine guns only have fully automatic fire and therefore pushing the right button will have no effect.

The current fire mode is shown on the bottom line of the LCD. For example FA means fully automatic and SA means semi-automatic.

Pushing the right button during live state will always cause the back light to come on for the LCD.

3.6.6 Hit State

When a unit is alive and it receives an infrared signal from another SATR unit in the same battle, a hit is triggered. If the hit reduces the health to 0, SATR enters into a "dead' state. When hit, a sound effect is heard, the actual sound effect depends on the current health level

Health Level	Sound Effect
4 or more	Near miss
2 or 3	Wound

SATR assumes that the character cannot really take 4 or more hits before being incapacitated, so when high hit points are used, early reduction in hit points are assumed to be a combination of skill and luck that the character managed to just avoid taking serious damage. For realistic games, Battlefield Sports recommends 2 or 3 hits points are used.

3.6.7 Dead/Deactivate State

The "Dead" status is reached when a SATR unit receives a hit from another SATR unit in the same battle and the receiver's health was 1 before the hit was received. Health is then reduced to 0.

In dead state, all gamer controlled functions are disabled. To escape from this state requires one of the following events
- Re spawn from a Master Controller or medic box (recommended for in game spawns)
- Game end/start radio signals
- New Game IR signal from a Master Controller
- Re-start using key switch (not recommend usually as this clears the statistics)

In Laser Tag mode, the term "Deactivated" is used instead of "Dead".

3.6.8 Pause

A SATR unit currently in live state can be stopped from taking any further gamer input by receiving a pause signal.

A pause signal can be received by radio, in which case all SATR units in the same battle will enter pause state or the signal can be received via an IR message. In the case of an IR message from a Master Controller, only the SATR unit targeted by the Master Controller will enter pause state.

When a SATR is first paused, a spoken sound effect is heard on the paused unit saying "Paused" in the language selected.

3.6.9 Resume

The resume function only works on SATR units that are currently in pause state.

When a SATR gaming gun is resumed, a spoken sound effect is heard on the resumed unit saying "Resumed" in the language selected.

3.6.10 Game Over

The "Game Over" signal comes via a radio signal from the Master Controller and impacts all SATR units in the same Battle as the Master Controller is configured too.

When the signal is received a voice saying "Mission Complete" can be heard on the receiving unit in the language selected.

While all gamer controlled functions are frozen, the final game statistics can be seen on the LCD. Initially the game stats will be shown which is all the stats from the last game, with a trigger pull, the session stats which are all the accumulate stats are shown. Session stats are all the stats since the most recent clr stats command was issued by a master controller or key on.

To exit game over you need to send a "start" via radio, or "new mission" via infrared, or manually use of the key switch.

If a timed game is used, the time left in the game will be displayed on the LCD of the master controllers and all gaming guns in weapon mode. If the gaming gun is out of RF range of a master controller at game end, it will still enter game over state based on the game timer.

3.6.11 Game Start

The game "Start" function starts a new game including resetting all statistics to 0 and restoring health and ammunition to full values assuming the target gaming guns are currently in game over state.

The game start signal can be received either via IR signal or radio signal. The radio signal only has effect if the gun is configured to the same battle as the Master Controller.

When the signal is received a voice saying "Mission Start" (or "Game Start" in Laser Tag sound scheme) can be heard on the receiving unit in the language selected.

If a timed game is started, then a countdown time will be displayed on the master controller and all target gaming guns in weapon mode. For gaming guns already started, a new radio start command will reset the countdown timer.

p

[USER GUIDE FOR SATR CODE V2.4C+]

This is an explanation of the K to D ratio used in the Battlefield Sports' SATR system.

SATR has two main themes – milsim and laser tag. With the SATR system the operator can select either a milsim theme and use the terms "hits / kills" and or a Laser Tag theme and use the terms "tags/deactivations". No matter which theme you select, the letters on the display for these statistics remain k/d and a/w.

The K/D ratio is the classic kill to death ratio. k/d ratio is a very common term in video games. It is one of the statistics shown on screen at the end of a game. K is the number of kills made on an opposition player and D is the number of times this gaming gun has been killed. In laser tag theme this represents the ratio of deactivations made on opponents to the number of times this unit was deactivated.

The a/w ratio provides some extra info for the gamer. This is the Assists to Wounds ratio. Where Assists is all hits and kills made by this gaming gun and Wounds are all the hits on this gaming gun including any hits that caused the gaming gun to die. In laser tag theme this represents the ratio of tags made on opponents to the number of times this unit was tagged. Basically it is all the hits you've made versus all the hits you've taken. It is a good guide for your gaming performance.

3.7 Medic Box

After initial boot go the right menus and work through until it says "weapon mode", then change this to "medic box" and then just keep pulling the trigger.

Once in a live state the medic box, the medic box will only accept the trigger button input, causing it to transmit a re-spawn signal to gaming guns nearby and in direct infrared line of sight.

The reload and mode buttons are disabled so the gamers cannot access any other function, it will only perform re-spawns. The medic box will count the number of re-spawns it performs by using the radio feedback system, up to 3 people can be spawned at a time and get fairly accurate counting. Medic box can be easily re-configured to work as an ammunition box. A good option is the combination box which can perform respawns and reloads.

The medic box will reset the counter for number of spawns after received a radio end/start combination. A medic box allows the number of re-spawns to be restricted to a specific count nominated by the referee on initial boot or the referee can set it to re-spawn for a certain number of minutes. Any gaming gun or Master Controller can also be configured to work as a medic box.

TEAM SPECIFIC RE-SPAWNS
Assuming all gaming guns are upgraded to SATR 1.3a or later software, the medic box can be configured to only re-spawn a specific team. If you set the medic box to team A, it will only re-spawn gaming guns also on team A. This only applies if you have friendly fire off.

CONFIGURING FIXED NUMBER OF RESPAWNS
On initial boot with key switch go to the right button menus, scroll through the list and make sure the current mode says "Medic Box" rather than something else like "weapon mode", "Controller mode", "Ammunition box", "Claymore Mine", "Normal Mine" or "Dirty Mine" .

After trigger push (pull on a gaming gun) the heading will say "Medic Box Type". Scroll through list using left or right button until it says "Limited Respawns" and then push trigger button. Use the left/right buttons to specify a number of respawns. Finally keep triggering through until the unit fully boots with a heading of "MEDIC Battle x" where x is the battle this medic box is assigned to.

CONFIGURING FIXED TIME RESPAWNS

This is very similar to configuring fixed number of re-spawns. Go to the "Medic Box Type" and make sure it says "Time Limited", push the trigger button and then use the left/right buttons to change the value in minutes. Allowable values are:

- 1 to 30 – select individual minutes, e.g. 4 or 12 or 15 etc
- From 30 – select minutes in increments of 5, e.g. 35, 50, 55 etc
- From 60 – select minutes in increments of 10, e.g. 70, 80, 100 up to a maximum of 120.

Time limited and unlimited respawns is recommend for most commercial games.

3.8 Domination Box

Boot up the gaming gun, push the black button. Work through until it says "weapon mode" this is the first option in "device role". Press the red button to scroll through the options until you see "domination box". You can select the intervals of the SFX:

- 60 seconds
- 30 seconds
- 15 seconds
- 5 seconds
- Disabled (i.e. no sound effects)

3.8.1 Timer options for a Domination Box

On the uncommon menu's the next option is the "Dom Box Type", options are "Use Ref Gun" and "Time Limited". The first option means the game timer will be picked up from the master controller game time synchronization pulses.

The second option is the Domination box can be set to its own game timer, this means after booting to a ready game state, the timer will start automatically on the box and when the timer runs out, the winning team will be announced.

If the box was set to a Domination Box on its last start, then just turn the key and press the green button for go: you will hear "mission start".

4 APPENDIX – SATR Weapon Emulation Chart

4.1 GUN CLASS #1 - Handguns

Weapon	Box _Capacity_	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time (Secs)	Jam Rate	Origin	Notes
Colt M-1911*	7	AL	3	180	Short	20	3	3	USA	The Colt M-1911 Automatic Pistol, has a 7 round box, is short ranged, comes with 20 boxes of .45ACP ammunition and takes 3 seconds to reload. .This was the standard US army service sidearm from 1911 until mid 1980s. The M-1911 served with distinction proving to be extremely reliable in harsh combat conditions.
Beretta 92FS (M9)	15	AL	2	180	Short	11	3	1	Italy	The Beretta FS Automatic Pistol, has a 15 round box, is short ranged, comes with 11 boxes of 9mm Parabellum ammunition and takes 3 seconds to reload. Production of Beretta 92 commenced in 1976 in Italy. The US military adopted the Model 92SB-F (later renamed to model 92FS) in 1985 as the M9 pistol.
Browning GP35 - HP	13	AL	2	180	Short	12	3	1	Belgium	The Browning HP35 Automatic Pistol, has a 13 round box, is short ranged, comes with 12 boxes of 9mm Parabellum ammunition and takes 3 seconds to reload. The Browning High Power has been widely used and copied with over 55 countries adopting it. Has proved very reliable and serviceable pistol. In WWII the German used it as Pistole 640(b).
H&KUSP Match	15	AL	2	180	Short	11	3	2	Germany	The Heckler & Koch USP Match Automatic Pistol, has a 15 round box, is short ranged, comes with 11 boxes of 9mm Luger ammunition and takes 3 seconds to reload. Heckler & Koch developed Universal Self-loading with manufacturing commencing in 1993. The concept of the new design was to provide a universal weapon for police and military forces, available in a variety of versions and sizes.
9mm Makarov	8	AL	2	180	Short	18	3	1	Russia	The Makarov Automatic Pistol, has an 8 round box, is short ranged, comes with 18 boxes of 9mm Soviet ammunition and takes 3 seconds to reload. The Makarov appeared in the 1950's and is based on the Walther PP, it

Weapon	Box Capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time (Secs)	Jam Rate	Origin	Notes
										was the standard issue side arm of the Russia forces until 2003. Widely used by many Warsaw pact countries.
Tokarev TT-33	8	AL	2	180	Short	18	3	1	Russia	The Tokarev TT-33 Automatic Pistol, has an 8 round box, is short ranged, comes with 18 boxes of 7.62 Soviet ammunition and takes 3 seconds to reload. The Tokarev TT (aka "Tula") pistol was developed for the red army as a new, modern semiautomatic pistol to replace obsolete Nagant M1895 revolvers. The TT-33 was used by the Soviet military from 1934 to the late 1960's.
Luger Pistole '08'	8	AL	2	180	Short	18	3	2	Germany	The Luger Automatic Pistol has an 8 round box, is short ranged, comes with 18 boxes of 9mm Parabellum ammunition and takes 3 seconds to reload. The luger was the standard issue German sidearm during WWI and saw frequent service until 1945. The last Luger was made in June 1942
Walther P38	8	AL	2	180	Short	18	3	2	Germany	The Walther P38 Automatic Pistol has an 8 round box, is short ranged, comes with 18 boxes of 9mm Parabellum ammunition and takes 3 seconds to reload. The Carl Walther company began development of the new military pistole in the mid-1930s, and in 1938 the Werhmacht (German Army) adopted Walther MP model experimental pistole as "Pistole 38". The P38 was the standard issue German sidearm in WWII.
Nambu 14 Shiko	8	AL	2	180	Short	18	3	8	Japan	The Nambu 14 Shiko Automatic Pistol has an 8 round box, is short ranged, comes with 18 boxes of 8mm ammunition and takes 3 seconds to reload. The type 14 pistol was designed by Japanese general Kijiro Nambu in 1925. This pistol was adopted by Imperial Japanese Army and widely used throughout WWII as the standard sidearm.
Smith & Wesson M & P	6	RV	2	180	Short	22	7	1	USA	The Smith & Wesson M&P Revolver has a 6 shot cylinder, is short ranged, comes with enough spare bullets to reload 22 times, and takes 7 seconds to reload. Ammunition is the 0.38 Special. The Smith & Wesson's "Military And Police" Revolver began production in 1899.

[USER GUIDE FOR SATR CODE V2.4C+]

Weapon	Box *Capacity*	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time (Secs)	Jam Rate	Origin	Notes
										During the next century, the total number revolvers manufactured by Smith & Wesson could be estimated at roughly six million including over 1 million guns delivered to the US Government in WWII.
Nagant M-1895	7	RV	2	180	Short	20	6	2	Russia	The Nagant M1895 Revolver has a 7 shot cylinder, is short ranged, comes with enough spare bullets to reload 20 times and takes 6 seconds to reload. Ammunition is 7.62mm Russian. The Nagant revolver was adopted by the Russian Army in 1895 and were manufactured in Tula Arsenal until the late 1930s.
Enfield Revolver	6	RV	2	180	Short	18	7	2	UK	The Enfield Revolver has a 6 shot cylinder, is short ranged, comes with enough spare bullets to reload 18 times, and takes 7 seconds to reload. Ammunition is .38 British. This revolver was developed at the Royal Small Arms Factory in Enfield between 1926 and 27. This revolver was adopted for Her Majesty's Military service in 1932 as the Enfield revolver, .38 caliber, No.2 Mark 1.

*Autoloader (AL) pistols get an addition 1 round in the first magazine to represent the round pre-loaded into the chamber

4.2 GUN CLASS #2 – Sub Machine Guns

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
Scorpion	25	FA,SA	2	330	Short	15	5	2/2	N/A	The Scorpion has been a standard Battlefield Sports gaming gun since 2004. It is designed to function as typical sub machine gun. It has a more science fiction shooting sound.
H&K MP5	30	FA,SA	2	M	Short	6	3	1/2	Germany	The Heckler & Koch MP5 submachine gun, features a 30 shot magazine, is capable of fully automatic and semiautomatic fire, has short range, has 6 spare magazines of 9mm Parabellum ammunition and takes 3 seconds to reload. The MP-5, is one of the most famous and wide-spread firearms of its class. Production commenced in 1965.
H&K MP5 SD	15	FA,SA	2	M	Short	12	5	1/2	Germany	The Heckler & Koch MP5SD submachine gun, features a 15 shot magazine, is capable of fully automatic and semiautomatic fire, has short range, has 12 spare magazines of 9mm Parabellum ammunition and takes 3 seconds to reload. MP5SD was introduced in 1974. It has an integrated suppressor and a special barrel which reduced the muzzle velocity of its ammunition to just below the speed of sound. It is almost inaudible at distances of more than 15 meters. The muzzle flash is virtually invisible. It is a weapon of choice for stealthy operations. The longer reload time reflects the lower reliability of silenced weapons.
UZI	25	FA,SA	2	M	Short	8	3	.5/1	Israel	The UZI submachine gun features a 25 shot magazine, is capable of fully automatic and semiautomatic fire, has short range, has 8 spare magazines of 9mm Parabellum ammunition and takes 3 seconds to reload. The UZI was designed in Israel by namesake Uziel Gal, and manufactured by IMI. The UZI has been adopted by police and military of more than 90 countries, including Israel, Germany and Belgium.

[USER GUIDE FOR SATR CODE V2.4C+]

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
M-1928A1 Thompson	100	FA,SA	2	M	Short	4	12	5/10	USA	The Thompson submachine gun features a huge 100 shot drum, is capable of fully automatic and semiautomatic fire, has short range, has 4 spare drums of .45ACP ammunition and takes 12 seconds to reload. Tommy guns were used by both Police and criminals to spread death in the 1920's. This gun was also widely used during WWII and later in the Korean war.
M-3 Grease Gun	30	FA	2	450	Short	6	4	12	USA	The M3 submachine gun features a 30 shot magazine, fires fully automatic only, has short range, has 6 spare magazines of .45ACP ammunition and takes 4 seconds to reload. The M3 submachine gun was also known as the Grease gun. The M3 was developed and manufactured by General Motors Corp. The M3 was introduced in 1942, and a simplified M3A1 launched in 1944. It remained in service in the USA until 1960.
Owen SMG	33	FA	2	M	Short	6	4	5	Australia	The Owen submachine gun features a 33 shot magazine, fires fully automatic only, has short range, has 6 spare magazines of 9mm parabellum ammunition and takes 4 seconds to reload About 45 000 Owen SMGs were made in Australia from 1942. These remained in service with Australian forces until the 1960s. These weapons were well liked by soldiers due to their robustness, reliability and simplicity.
Sten Mark 2	32	FA	2	450	Short	6	4	5/5	UK	The Sten Mark 2 submachine gun features a 32 shot magazine, fires fully automatic only, has short range, has 6 spare magazines of 9mm parabellum ammunition and takes 4 seconds to reload

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										It was one of the crudest and ugly SMG designs of WW2. But more than 4 million STEN's of different versions were made from 1941 until 1945.
MP38/40	32	FA	2	500	Short	6	3	4	Germany	The MP38 submachine gun features a 32 shot magazine, fires fully automatic only, has short range, has 6 spare magazines of 9mm parabellum ammunition and takes 3 seconds to reload. The MP-38 and later MP-40 were adopted by the Wehrmacht in 1938 and 1940, respectively. The MP40 was often incorrectly called the **Schmeisser** by the Allies, after Hugo Schmeisser who produced the guns' magazines. Some 1.2 million MP-38 & 40s were manufactured prior to and during WWII. Initially, the MP-38 was intended for use by paratroopers, but later was widely used by the German infantry.
MP18	32	FA	2	400	Short	6	8	4	Germany	The MP18 submachine gun features a 32 shot helical drum, fires fully automatic only, has short range, has 6 spare drums of 9mm Parabellum ammunition and takes 8 seconds to reload. The rate of fire is only 400 RPM. This is the world's first successful submachine gun. The MP18 saw action in WWI with 30,000 manufactured. The high reload time reflects the difficulty with the snail drum fed rounds.
MP28-50	50	FA,SA	2	500	Short	5	8	4	Germany	The MP28 submachine gun features a 50 shot magazine, is capable of fully automatic and semiautomatic fire, has short range, has 5 spare magazines of 9mm Parabellum ammunition and takes 8 seconds to reload. The MP 28/II is a direct descended of the MP18/I with the primary improvements being selective fire and faster rate of fire. The long reload time reflects the high chance of jamming.
MAT 49-20	20	FA,SA	2	404	Short	9	3	4	French	The MAT49 submachine gun features a 20 shot magazine, is capable of fully automatic and

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										semiautomatic fire, has short range, has 9 spare magazines of 9mm Parabellum ammunition and takes 3 seconds to reload.
										The MAT-49 submachine gun was developed at the French state arms factory "Manufacture Nationale d'Armes de Tulle" in the late 1940s, and was adopted French Army in 1949. First batches were made in 1950, and production continued until 1979.
MAT 49-32	32	FA	2	M	Short	6	4	4	Vietnam	The North Vietnamese MAT49 SMG is a simplified version of the French model, it features a 32 shot magazine, fires fully automatic only, has short range, has 6 spare magazines of 7.62mm Soviet ammunition and takes 4 seconds to reload.
										The MAT-49 saw widespread combat use during the Indo-China war.
										After French forces left Indochina, the NVA converted many captured MAT-49s to the Soviet Tokarev pistol cartridge, then available in large quantities from the Soviet Union and the People's Republic of China.
PPS-43	35	FA	2	M	Short	6	4	3	Russia	The PPS-43 submachine gun features a 35 shot magazine, fires fully automatic only, has short range, has 6 spare magazines of 7.62mm Soviet ammunition and takes 4 seconds to reload.
										The PPS-42 launched in 1942 and was further refined in 1943 to become the PPS-43. Many consider the PPS-42 the best SMG of WWII; it was widely exported to pro-Soviet regimes around the world and widely copied.
PPSh-41	71	FA	2	M	Short	4	10	5	Russia	The PPSh-41 submachine gun features a 71 shot Suomi drum, fires fully automatic only, has short

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										range, has 4 spare drums of 7.62mm Soviet ammunition and takes 10 seconds to reload. The PPSh-41, Pistolet Pulemjot Schpagina model of 1941 was one of major infantry weapons of the Soviet troops during WWII. More than 6 million we made. The PPSh 41 was widely exported to some pro-Soviet countries, including Vietnam and many African countries. The 71 round drum provides a lot of firepower but is slow to reload.
FN P90	50	FA,SA	3	M	Medium	4	4	1	Belgium	The P90 personal defense weapon, features a 50 round magazine, supports both fully automatic and semiautomatic fire, has medium range, has 4 reloads of 5.7mm FN ammunition and takes 4 seconds to reload. The FN P90 was developed in the late 1980s as a defensive weapon for the troops whose primary activities do not include small arms. Troops such as vehicle, tank & artillery crews. Standard Pistols and SMGs chambered for pistol rounds had proven ineffective against enemy soldiers, wearing bulletproof vests, so FN developed a new round with enhanced penetration - the SS190.

4.3 GUN CLASS #3 - Rifles

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
Commando	30	FA,SA	2	330	Medium	12	5	3/3	N/A	The Commando has been the standard issue carbine by Battlefield Sports since 2004. It is designed to function as a typical modern carbine.
Honey Badger	30	BF,SA	3	330	Long / Short	12	5	2/2	N/A	The Honey Badger has support for both supersonic fire at long range and subsonic fire at short range with reduced muzzle flash and reduced firing noise. To toggle between supersonic and subsonic hold down the mode button and push the reload button. Each toggle uses a magazine.
M16A2	30	BF,SA	2	M	Long	6	3	2/2	USA	The M16A2 combat rifle features a 30 shot magazine, both burst and semiautomatic fire, long range, 6 spare magazines of 5.56mm NATO ammunition and takes 3 seconds to reload... The M16A2 became the general issue rifle with the US armed forces in 1985. The action was modified, replacing the fully-automatic setting with a three-round burst. The M16 rifles are used by many foreign military groups, most notably the British SAS, who preferred the M16 over the infamous L85A1 rifle.
M16A1 -1970	30	FA,SA	2	M	Long	6	3	3/5	USA	The M16A1 assault rifle features a 30 shot magazine, both automatic and semiautomatic fire, long range, and has 6 spare magazines of 5.56mm NATO ammunition and takes 3 seconds to reload. The M16A1 was the general-issue rifle with the US Armed forces from 1970. This model featured a larger magazine from its predecessor. Improved ammunition and cleaning significantly reduced jamming compared to the earlier issued equipment.

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
M16 - 1967	20	FA,SA	2	M	Long	8	5	4/8	USA	The M16 assault rifle features a 20 shot magazine, supports both automatic and semiautomatic fire, has long range, has 8 spare magazines of 5.56mm NATO ammunition and takes 5 seconds to reload. The initial version was fielded by the US Armed Forces in the early 1960s. The early version which saw action in Vietnam only had a 20 round magazine. Reload time is increased to simulate the high risk of jamming.
Colt Commando	20	FA,SA	2	M	Medium	8	5	2/3	USA	The Colt Commando features a 20 shot magazine, supports both automatic and semiautomatic fire, has medium range,has 8 spare magazines of 5.56mm NATO ammunition and takes 5 seconds to reload.. A carbine version M16 assault rifle appeared under the name of CAR-15 in 1965, and was intended for the US Special Forces who fought in Vietnam. In mid-1967 Colt slightly upgraded the Commando by lengthening the barrel up to 11.5 inches, and this version was adopted as XM-177E2.
M14 Rifle	20	SA	3	M	Long	8	3	2	USA	The M14 Rifle features a 20 shot magazine, has semiautomatic fire only, has long range, has 8 spare magazines of 7.62mm NATO ammunition and takes 3 seconds to reload.. The M14 Rifle was adopted by the US Military as the general issue rifle in 1957 until its replacement by the M16. Most M14 Rifles permitted semiautomatic fire only to avoid overheating the barrel.
M24 Sniper Rifle	6	BA	3	45	Long	20	3	0	USA	The M24 Sniper Rifle is a bolt action rifle with a 6 shot box, has long range, has 20 spare boxes of 7.62mm NATO ammunition takes 3 seconds to reload. The Remington M24 is the standard sniper rifle in the US military. First shipments commenced in 1987.
Simonov Carbine SKS	10	SA	2	M	Long	25	5	3	Russia	The Simonov Carbine has a 10 shot magazine and fires in semiautomatic only, has long range, has 25 spares

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										magazines of 7.62mm Soviet ammunition and takes 5 seconds to reload.
										A very simple, easy to operate automatic loading carbine widely used in communist countries.
AK47/AKM	30	FA,SA	2	M	Medium	6	3	.5/.5	Russia	The AK47 assault rifle features a 30 shot magazine, supports both automatic and semiautomatic fire, has medium range, has 6 spare magazines of 7.62mm Soviet ammunition and takes 3 seconds to reload.
										The Kalashnikov assault rifle, also known as the AK-47, or simply "the AK" is the most prolific small arm since WWII. The total number of the AK-type rifles made worldwide is estimated at 90+ million. This is a true legendary weapon, known for its extreme ruggedness, simplicity of operation and maintenance, and unsurpassed reliability even in worst conditions.
AK74	30	FA,SA	2	M	Long	6	3	.5/.5	Russia	The AK74 combat rifle features a 30 shot magazine, supports both automatic and semiautomatic fire, has long range, has 6 spare magazines of 5.45mm Russian ammunition and takes 3 seconds to reload. At the present time the AK-74M, along with the earlier AK-74 and AKS-74 is the standard issue rifle of the Russian Army. The AK74 is a heavily updated AKM which uses a smaller caliber, high velocity round.
Dragunov SVD	10	SA		3	30	Long	19	3	1	Russia	The Dragunov sniper rifle has a 10 shot magazine and fires in semiautomatic only, has long range, has 19 spare 7.62mm Russian magazines and takes 3 seconds to reload.
										In 1963 the SVD (Snaiperskaya Vintovka Dragunova) was accepted by the Soviet Military. The SVD has seen much action and passed all combat tests including

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										service in Vietnam, Afghanistan and the Chechen conflict.
M-1903 Rifle	5	BA	3	30	Long	25	3	.5	USA	The M-1903 is a bolt action rifle with a 5 shot box, has long range, has 25 spare .3 inch M1903 ammunition boxes and takes 3 seconds to reload.
										The M1903 rifle is a manually operated, rotating bolt, Magazine fed rifle. M1903 saw service in WWI and WWII.
H&K G3	20	FA,SA	3	500	Long	8	3	1/1	Germany	The Heckler & Koch G3 assault rifle features a 20 shot magazine, is capable of fully automatic and semiautomatic fire, has long range, has 8 spare magazines of 7.62mm NATO ammunition and takes 3 seconds to reload.
										In 1959 the Bundeswehr adopted the Heckler & Koch rifle as the G3. Until 1995 the G3 in various modifications served as a general issue shoulder weapon not only for German Armed forces, but also for many other countries.
M1 Garand	8	SA	3	M	Long	25	3	.5	USA	The M1 Garand rifle features an 8 shot internal box, has semiautomatic fire only, has long range, has 25 spare .30 M1906 ammunition and takes 3 seconds reload.
										M1 Garand was the most widely used semi-automatic rifle of WWII amongst US forces. The M1 Garand was also used in the Korean war and the early stages of the Vietnam war.
M1 Carbine	15	SA	2	M	Medium	12	3	.5	USA	The M1 Carbine features a 15 shot magazine, has semiautomatic fire only, has medium range,has 12 spare .30 M1906 ammunition and takes 3 seconds reload.
										Winchester delivered its first carbines to the US Military in July, 1942. During the period from 1942 till 1945 more than 6 million carbines were manufactured.

[USER GUIDE FOR SATR CODE V2.4C+]

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
M2 Carbine	30	FA,SA	2	M	Medium	6	3	.5/4	USA	The M2 Carbine features a 30 shot magazine, fires both automatic and semiautomatic, has medium range, has 6 spare magazines of .30 M1906 ammunition and takes 3 seconds to reload The M2 was an improved, selective-fire version of the M1. It also had a larger 30 round magazine. Its lack of effectiveness at long range was its primary drawback compared to many other assault rifles.
Lee-Enfield SMLE	10	BA	3	30	Long	19	3	.5	UK	The Lee-Enfield SMLE is a bolt action rifle with a 10 shot box, has long range, has 19 spare .303 British ammunition boxes and takes 3 seconds to reload. Various versions of the Short, Magazine, Lee-Enfield were issued to the British Army from 1903 to the mid 1950's. The weapon proved reliable and accurate with a high rate of fire for bolt action rifles of the period.
Mosin-Nagant Rifle	5	BA	4	30	Long	25	3	1	Russia	The Mosin-Nagant is a bolt action rifle with a 5 shot box, has long range, has 25 spare 7.62mm Soviet ammunition boxes and takes 3 seconds to reload. The Mosin-Nagant rifle, known in Russia as a "Vintovka Mosina", was officially adopted for service by the Russian Tsar in 1891. Production of this rifle continued until 1948. The rifle in was the standard military arm of the Russian and the Red army for some 60 years.
Steyr AUG	30	FA,SA	2	M	Long	6	3	½	Austria	The Steyr AUG rifle features a 30 shot magazine, has both automatic and semiautomatic fire, has long range, has 6 spare magazines of 5.56mm NATO ammunition and takes 3 seconds to reload. The Steyr (Armee Universal Gewehr – in other words the Universal Army Rifle) was adopted by the Austrian Army in 1977, as the Stg.77

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										The Steyr AUG has been used by many armed forces including Australia, Austria, New Zealand, Oman, Malaysia, Saudi Arabia and, Ireland.
FN-FAL/L1A1 SLR	20	SA	3	M	Long	10	3	5	Belgium	The FN FAL features a 20 shot magazine, has semiautomatic fire only, has long range, has 10 spare magazines of 7.62mm NATO ammunition and takes 3 seconds to reload.
										The FN Fusil Automatique Léger (light automatic rifle) or FAL was first adopted as the C1 in 1955. Belgium adopted the rifle in 1956 and Britain in 1957 as an L1A1 SLR (Self-loading rifle). It is often issued with 4X SUIT optical scopes. The FN FAL was widely adopted until the 1990s.
L85A1-2 /SA80	30	FA,SA	2	M	Long	6	5	2/4	UK	The L85A1 combat rifle features a 30 shot magazine, fires both automatic and semiautomatic, has long range, has 6 spare magazines of 5.56mm NATO ammunition and takes 5 seconds to reload.
										The British army adopted the L85A1 for the Falkland war in 1984. Originally L85A1s were quite unreliable and troublesome to handle and maintain. The long reload time reflects the high chance of stoppages.
H&K G36	30	FA,SA	2	M	Long	6	2	1/1	Germany	The Heckler & Koch G36 combat rifle features a 30 shot magazine, fires both automatic and semiautomatic, has long range, has 6 spare magazines of 5.56mm NATO ammunition and takes 2 seconds to reload.
										The H & K G-36 is the service rifle of the German Armed Forces. It was adopted by the Bundeswehr in 1995 and the Spanish Army in 1999. The guns have a distinctive translucent plastic magazine which is fitted with studs to allow magazines to be clipped together easily which enables faster reloading. A 100-round drum magazine can also be attached.

[USER GUIDE FOR SATR CODE V2.4C+]

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
MP-43 Mp-44 Stg.44	30	FA,SA	2	500	Medium	6	4	1/2	Germany	The MP-43 assault rifle features a 30 shot magazine, fires both automatic and semiautomatic, has medium range, has 6 spare magazines and takes 4 seconds to reload.
										The world's first assault rifle was developed in Hitler's Germany during WW2. The total number of MP-43s, MP-44s and StG.44s produced was about 500 000. And these rifles proved very effective in combat.
Kar 98K	5	BA	4	30	Long	25	3	.5	Germany	The Kar 98k is a bolt action rifle with a 5 shot box, has long range, has 25 spare 7.92 Mauser M98 ammunition boxes and takes 3 seconds to reload.
										The Kar 98k was the standard German Army rifle of WWII. This Bolt Action Rifle while largely obsolete proved to be reliable and strong. Manufacturing of this rifle continued throughout the war.
Musket	1	SS	4	30	Long	30	19	15		This is typical example of a pre 20th century musket. It is capable of a maximum of firing 3 rounds per minute. It has long range for the period.

4.4 GUN CLASS #4 – Machine Guns

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
Morita	99	FA,SA	2	400	Long	6	10	1/2	N/A	The Morita is the standard issue gaming gun representing a typical light machine gun from Battlefield Sports. The Morita has been in continuous manufacture since 2002.
FN Minimi / M249	200	FA	2	M	Long	7	6	1	Belgium	The Minimi light machine gun features a 200 shot belt, fires fully automatic only, has long range, has 7 spare belts of 5.56mm NATO ammunition, and takes 6 seconds reload.
										The Minimi light machine gun was developed by FN Herstal. Mass production began in 1982 in Belgium. About the same time it was adopted by the US Armed forces as the M249 Squad Automatic Weapon (SAW). The Minimi is used by many western allied countries. The longer reload time reflects time it takes to let the barrel cool down and then change.
M60 GPMG	100	FA,SA	2	550	Long	7	8	4	USA	The M60 general purpose machine gun features a 100 shot belt, fires both fully automatic and semiautomatic, has long range, has 7 spare belts of 7.62mm NATO ammunition and takes 8 seconds to reload.
										The M60 machine gun was designed in the late 1940's based on the German MG42. The M60 was adopted by the US military in 1950. The longer reload time reflects the time it takes to let barrel cool down and the awkward barrel change as well as the general poor reliability of the M60.
RPD/Type 56 LMG	100	FA	2	M	Long	7	12	1	Russia	The RPD light machine gun features a 100 shot drum, fires fully automatic only, has long range, has 7 spare drums of 7.62mm M1943 Soviet ammunition and takes 12 seconds to reload.
										The RPD was the standard light machine gun of 1Soviet army since the early 1950s till the 1960s. It

[USER GUIDE FOR SATR CODE V2.4C+]

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										was widely exported to many pro-Soviet countries and regimes around the world. The Chinese made a copy called the Type 56 LMG. The longer reload time reflects time it takes to let the barrel cool down.
RPK LMG	40	FA	2	M	Long	9	6	1	Russia	The RPK light machine gun features a 40 shot box, fires fully automatic only, has long range, has 9 spare boxes of 7.62mm M1943 Soviet ammunition and takes 6 seconds to reload.
										The RPK became the standard issue LMG of the Red Army from the early 1960's. The RPK is an AK assault rifle modified with a sturdier receiver, a heavier and longer, non detachable barrel, and a re-contoured wooden stock. The non detachable, folding bi-pod is mounted under the muzzle. The longer reload time reflects time it takes to let the barrel cool down.
RPK 74 LMG	45	FA,SA	2	600	Long	8	8	1/1	Russia	The RPK-74 light machine gun features a 45 shot Magazine, fires both fully automatic and semiautomatic, has long range, has 8 spare Magazines of 5.45mm Russian ammunition and takes 8 seconds to reload.
										The RPK-74 is the standard issue light machine gun of the Soviet/Russian army since the late 1970's. It is the LMG version of the AK74 combat rifle. The longer reload time reflects time it takes to let the barrel cool down and then change.
M1919A4 MMG	250	FA	2	500	Long	4	12	2	USA	The M1919A4 medium machine gun features a 250 shot magazine, fires fully automatic only, has long range, has 4 spare boxes of .30inch M1906 ammunition and takes 12 seconds to reload.

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										The Browning Machine Guns were adopted by the US Military as the M1917. The 1919A4 was virtually the standard US medium machine gun of WWII.
M-1918A2 BAR	20	FA	2	450	Long	15	4	2	USA	The BAR automatic rifle features a 20 shot magazine, fires fully automatic only, has long rang3e, has 15 spare .30inch M1906 ammunition and takes 4 seconds to reload.
										The M1918A2 BAR filled a Squad Automatic Weapon role with the US troops during WWII and later in the Korean War. The limited 20 round magazine meant it was under powered as a Light Machine Gun.
Maxim MG08 MMG	250	FA	2	450	Long	4	12	1	Germany	The Maxim Medium Machine Gun features a 250 shot belt, fires fully automatic only, has long range, has 4 spare belts of 7.92 Mauser ammunition and takes 12 seconds to reload.
										The Maxim was widely used in WWI by the German Army. It was a heavy duty water cooled machine gun capable of long and sustained fire. But it was very heavy.
Degtyarev DP LMG	47	FA		2	600	Long	10	8	6	Russia	The Degtyarev Light Machine Gun features a 47 shot drum, fires fully automatic only, has long range, has 8 belts of 7.62mm Soviet ammunition and takes 10 seconds to reload.
										Adopted by the Red Army in 1928 it remained the Soviet Union's standard issue LMG until the 1950's. The DP and the DPM (Modernized) LMG's were widely exported to Soviet-friendly countries.
DShK M1938 HMG	50	FA	2	550	Long	9	4	3	Russia	The DShK M1938 Heavy Machine Gun features a 50 shot belt, fires fully automatic only, has long range, has 9 belts of 12.7mm Soviet ammunition and takes 4 seconds to reload.

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										This was the standard issue heavy machine gun in the Soviet Union throughout WWII. And was also widely used in the Korean war. After WWII, the weapon was widely distributed to Warsaw Pact countries. The 12.7mm (.50) AP bullets used can pierce 15mm armor plate at 500yards.
Lewis Mk1 LMG	47	FA	2	550	Medium	10	12	2	UK	The Lewis Light Machine Gun features a 47 shot pan, fires fully automatic only, has medium range, has 10 belts of .303in British ammunition and takes 12 seconds to reload.
										The Lewis gun was the first light machine gun used extensively in war. It saw action throughout WWI and some saw action in WWII with the British Army. A careful reload process is required to avoid accidental discharge and frequent stoppages are reflected in its long reload time.
Bren MkII LMG	30	FA	2	500	Long	11	8	2	UK	The Bren Light Machine Gun features a 30 shot magazine, fires fully automatic only, has long range, has 11 magazines of .303inch British ammunition and takes 8 seconds to reload.
										The designation BREN stands for (BRno-ENfield). Manufacture of the Bren Mk.1 began in Enfield in the United Kingdom in 1937. The Bren was widely used by Commonwealth countries.
Vickers Mk 1 MMG	250	FA	2	450	Long	4	10	2	UK	The Vickers Medium Machine Gun features a 250 shot belt, fires fully automatic only, has long range, has 4 belts of .303inch British ammunition and takes 10 seconds to reload.
										This machine gun was adopted by the British army in 1912 and remained the standard support fire machine gun until the mid 1960's. It is a heavy

Weapon	Magazine capacity	Fire Modes	Recoil	ROF	Range	Reloads	Reload Time	Jam Rate	Origin	Notes
										slow firing weapon that proved very reliable. The water cooled barrel ensured a long barrel life.
MG42 LMG	50	FA	2	M	Long	9	8	2	Germany	The MG42 Light Machine Gun features a 50 shot belt, fires fully automatic only, has long range, has 9 belts of 7.92 Mauser ammunition and takes 8 seconds to reload.

One of the best machine guns of WWII, it was the standard issue German LMG. Modified versions of the MG42 are today still in production. |

Reload time on Machine Gun takes into account barrel cool down.   Most machine guns have low recoil values reflecting their usual mounting on a bipod or tripod.

5 Appendix – Recommend Weapon Emulations by Model

Battlefield Sports recommends that gamers are restricted in what they configure their gaming gun too. It's important to retain game balance and the principle of what you see is what you get is maintained. Certain Live Plays specify particular models and when they do, that takes precedence over this list.

BATTLEFIELD SPORTS' MODEL	ALLOWABLE WEAPONS
SCORPION / COBRA/SPITFIRE	Scorpion,MP5 (not SD),M-3 Grease Gun, Owen SMG, Sten Mark 2, P38/40, P18, MAT 49-20, MAT 49-32, PPS-43, P90
P90	FN P90, MP28-50,PPsh-41
COMMANDO Carbine	Commando, Colt Commando, AK47/AKM, M1 Carbine, M2 Carbine, MP-43, MP-44, Stg 44
Commando Sniper	M24 Sniper Rifle, Dragunov SVD
Morita SAW	Any machine gun emulation although M60 GPMG is a good choice.

5.1 Quick Emulation Setup

On the Battlefield Sports operated battlefields with hundreds of gaming guns in operation, often more than 100 gamers at a time in a single game, a quick system for specifying suitable weapon emulations is required. This is done after the target reset command is performed on all target gaming guns by using the set weapons/chg weapons commands on the master controller. We set all the handguns to H&KUSP Match, all the submachine guns to P90's, all the rifles to HK G36 and all the machine guns to M60 GPMG.

6 APPENDIX – Wounds Chart

When wounds are configured, instead of the unit simply saying dead, the display provides a code showing the type and severity of the wound.   This has application for military training operations.

SERIOUS WOUNDS

1 (TO) - Single shot to chest - punctured lung.

2 (TO) - Single shot to chest - Arterial bleeding.

3 (TO) - Internal bleeding, no puncture wounds - chest discoloured.

4 (TO) - Puncture entry wound to chest and exit wound in back.

5 (TO) - Puncture entry wound to abdomen and exit wound in back.

6 (TO) - Puncture entry wound to chest and no exit wound.

7 (TO) - Puncture entry wound to abdomen and no exit wound.

8 (TO) - Puncture entry wound to groin, arterial wound.

9 (TO) - Puncture entry wound to back, Left kidney area, no exit wound.

0 (TO) - Puncture entry wound to back, Right Kidney area, exit wound to front.

1 (HE) - Single shot to Jaw - breathing blocked.

2 (HE) - Single shot to neck - Arterial bleeding, breathing difficult.

3 (HE) - Impact trauma, no puncture wounds, unconscious.

4 (HE) - Entry wound to neck and exit wound in back.

5 (HE) - Entry wound to left eye and exit wound to back of head, still breathing.

6 (HE) - Entry wound to right eye and exit wound to back of head, still breathing.

7 (HE) - Top of head has entry wound, skull fragments and brain visible. still breathing.

8 (HE) - Small entry wound to forehead. large exit wound at rear. No breathing.

9 (HE) - Entry wound at rear of neck, casualty cannot move limbs.

0 (HE) - Entry wound at front of neck, exit wound at rear, no spinal or arterial damage.

1 (LL) - Single shot to thigh, femer damage.

2 (LL) - Single shot to shin, shin damage.

[USER GUIDE FOR SATR CODE V2.4C+]

3 (LL) - Complicate fracture, thigh.

4 (LL) - Puncture entry wound thigh, exit wound at rear, arterial bleed.

5 (LL) - Puncture entry wound to knee and exit wound a rear.

6 (LL) - Puncture entry wound to foot.

7 (LL) - Puncture entry wound to rear of thigh, exit wound to front, arterial bleed.

8 (LL) - Puncture entry wound to rear of calf, exit wound to front, arterial bleed.

9 (LL) - Puncture entry wound to front of thigh, exit wound at knee, arterial bleed.

0 (LL) - Leg amputated from the knee down.

1 (RL) - Single shot to thigh, fema damage.

2 (RL) - Single shot to shin, shin damage.

3 (RL) - Complicate fracture, thigh.

4 (RL) - Puncture entry wound thigh, exit wound at rear, arterial bleed.

5 (RL) - Puncture entry wound to knee and exit wound at rear.

6 (RL) - Puncture entry wound to foot.

7 (RL) - Puncture entry wound to rear of thigh, exit wound to front, arterial bleed.

8 (RL) - Puncture entry wound to rear of calf, exit wound to front, arterial bleed.

9 (RL) - Puncture entry wound to front of thigh, exit wound at knee, arterial bleed.

0 (RL) - Leg amputated from the knee down.

1 (LA) - Single shot to bicep, humerus damage.

2 (LA) - Single shot to forearm, radius damage.

3 (LA) - Complicate fracture, single shot to elbow.

4 (LA) - Puncture entry wound bicep, exit wound, arterial bleed.

5 (LA) - Hand severed at wrist.

6 (LA) - Puncture entry wound to shoulder, exit wound.

7 (LA) - Forearm severed at elbow.

8 (LA) - Arm severed at shoulder.

9 (LA) - Puncture wound rear of shoulder, no exit wound,

0 (LA) - Puncture wound rear of shoulder, exit wound to front.

1 (RA) - Single shot to bicep, humerus damage.

2 (RA) - Single shot to forearm, radius damage.

3 (RA) - Complicate fracture, single shot to elbow.

4 (RA) - Puncture entry wound bicep, exit wound, arterial bleed.

5 (RA) - Hand severed at wrist.

6 (RA) - Puncture entry wound to shoulder, exit wound.

7 (RA) - Forearm severed at elbow.

8 (RA) - Arm severed at shoulder.

9 (RA) - Puncture wound rear of shoulder, no exit wound,

0 (RA) - Puncture wound rear of shoulder, exit wound to front.

SHOCK

All the same for each body part, repeat of dehydration, massive blood loss and exhaustion as most likely / on trend in theatre.

1 - Dehydration

2 - Massive blood loss

3 - Exhaustion
4 - Overheating

5 - Cold injury

6 - Witnessed a traumatic experience

7 - Involved in a traumatic experience

8 - Exhaustion
9 - Massive Blood Loss

0 - Dehydration

[USER GUIDE FOR SATR CODE V2.4C+]

SUPERFICIAL WOUNDS

1 (TO) - Single shot flesh wound to left of chest.

2 (TO) - Single shot flesh wound to right of chest.

3 (TO) - Single shot flesh wound to right of abdomen.

4 (TO) - Single shot flesh wound to left of abdomen.

5 (TO) - Single shot flesh wound to right clavicle.

6 (TO) - Single shot flesh wound to left clavicle.

7 (TO) - Flesh wound to chest and abdomen.

8 (TO) - Single shot flesh wound to lower back.

9 (TO) - Single shot flesh wound to rear right shoulder.

0 (TO) - Single shot flesh wound to rear left shoulder.

1 (HE) - Flesh wound to right cheek.

2 (HE) - Single shot flesh wound to neck.

3 (HE) - Impact trauma, conscious.

4 (HE) - Flesh wound to left cheek.

5 (HE) - Flesh wound to left ear.

6 (HE) - Flesh wound to right ear.

7 (HE) - Flesh wound to top of head.

8 (HE) - Flesh wound to back of head.

9 (HE) - Flesh wound to right hand side of jaw.

0 (HE) - Flesh wound to left hand side of jaw.

1 (LL) - Single shot to upper thigh, flesh wound.

2 (LL) - Single shot to shin, flesh wound.

3 (LL) - Single shot to knee, flesh wound.

4 (LL) - Single shot to lower thigh, flesh wound.

5 (LL) - Single shot to toes, flesh wound.

6 (LL) - Single shot to glute, flesh wound.

7 (LL) - Single shot to calf, flesh wound.

8 (LL) - Single shot to heel, flesh wound.

9 (LL) - Shot to thigh and calf, flesh wounds.

0 (LL) - Shot to inner thigh, flesh wound.

1 (RL) - Single shot to upper thigh, flesh wound.

2 (RL) - Single shot to shin, flesh wound.

3 (RL) - Single shot to knee, flesh wound.

4 (RL) - Single shot to lower thigh, flesh wound.

5 (RL) - SIngle shot to toes, flesh wound.

6 (RL) - Single shot to glute, flesh wound.

7 (RL) - Single shot to calf, flesh wound.

8 (RL) - Single shot to heel, flesh wound.

9 (RL) - Shot to thigh and calf, flesh wounds.

0 (RL) - Shot to inner thigh, flesh wound.

1 (LA) - Single shot to bicep, flesh wound.

2 (LA) - Single shot to forearm, flesh wound.

3 (LA) - Single shot to elbow, flesh wound.

4 (LA) - Single shot to shoulder, flesh wound.

5 (LA) - SIngle shot to hand, forefinger severed.

6 (LA) - Single shot to hand, flesh wound.

7 (LA) - Single shot to wrist, flesh wound.

8 (LA) - Single shot to tricep, flesh wound.

9 (LA) - Single shot to shoulder, through and through, flesh wound.

[USER GUIDE FOR SATR CODE V2.4C+]

0 (LA) - Shots to forearm and bicep, flesh wound.

1 (RA) - Single shot to bicep, flesh wound.

2 (RA) - Single shot to forearm, flesh wound.

3 (RA) - Single shot to elbow, flesh wound.

4 (RA) - Single shot to shoulder, flesh wound.

5 (RA) - Single shot to hand, forefinger severed.

6 (RA) - Single shot to hand, flesh wound.

7 (RA) - Single shot to wrist, flesh wound.

8 (RA) - Single shot to triceps, flesh wound.

9 (RA) - Single shot to shoulder, through and through, flesh wound.

0 (RA) - Shots to forearm and bicep, flesh wound.

7   2.2f Master Controller compatibility with 1.2e

Many of the master controllers functions found in 2.2f code are incompatible with much older versions of SATR. This is the compatibility between 1.2e (or any 1.x versions) gaming guns and 2.2f gaming guns. It is recommend that all gaming guns are upgraded to the latest software.

2.2f Master Controller Function	1.x Compatibility
Respawn	Incompatible
Reload	Compatible
Kill	Incompatible
Pause (IR)	Incompatible
Resume (IR)	Incompatible
New Mission (IR)	Compatible
Mystery-Class	Incompatible
Mystery – Rand	Incompatible
Jam Weapon	Incompatible
Shoot	Compatible
Pause (Radio)	Compatible
Resume (Radio)	Compatible
Start (Radio)	Compatible
End (Radio)	Compatible
Clr Stats	Incompatible
Set Team	Compatible
Target Reset	Compatible
Set/Chg Weapons	Compatible
Class Menu	Incompatible
Set Health	Compatible
Set Difficulty	Compatible
Set Indoor	Incompatible
Set Outdoor	Incompatible
Set Locked	Incompatible – performs a Pause
Set Unlocked	Incompatible
Volume Menu	Incompatible
Chg Language	Incompatible – performs a kill
Add Gun Time	Incompatible
Chg Batte	Compatible
Test RF	Incompatible
Interrogate	Incompatible

8   TROUBLE SHOOTING

8.1 A Gaming Gun will not hit another one! (BATTLE/GAME)

- The first thing to check is to make sure both the shooting gaming gun and the target gaming gun are on the same "Battle" (the term "**Game**" is used with Laser Tag sound effects). SATR is designed to allow one battle/game to be isolated from another

battle/game so that radio and infrared messages between battles/games is prevented. Four separate battles/games are supported. By default Battle/Game 1 is used.

- To check what battle the gaming gun is set on:

  - If the gaming guns are in ready state, check the far ride side of the 3rd line to verify the gaming gun is one the correct battle (usually "1") and have the right team settings (X for friendly fire on or A/B for team settings. Remember don't mix friendly fire on with team settings and if using team settings much sure each gaming gun is on a different team)
  - Turn the gaming gun off, then on again with the key.
  - Pull the trigger and then look at the display
  - As the gun says "mission start" the display will show on the first line "countdown" and on the second line "battle 1." If this "battle 2" or "battle 3" or "battle 4" you are on the wrong battle.

To return the gaming gun back to Battle 1:

OPTION 1: Use the Set Battle function on the master controller

OPTION 2: Use the Target Reset function on the master controller to reset all the settings except language but including battle back to factory defaults. This will turn on friendly fire.

OPTION 3: Use the menus accessible upon initial boot through the right button (black) and scroll through to "Battle" and change this value to 1.

8.2   A Gaming Gun will not hit another one! (FRIENDLY FIRE OFF)

Often friendly fire is turned off by assigning gaming guns to teams. The result is a gaming gun on team A cannot hit another gaming gun on team A, similarly for team B. Gaming guns not assigned to a team do not work properly with gaming guns assigned to a team.

Assigning gaming guns to teams is common practice and recommended for most civilian groups. However the referees need to be careful that they have assigned the gaming guns to the right team. When in doubt check the LCD while the gaming gun is in ready state. The last character on the 3rd line indicates the team (A means team A, B means teams B and X means not assigned to a team).   The best way to assign gaming guns to teams is to move each team into their form up position and then use the Set/Chg Team functions on the master controller to configure each team independently. It is recommended the team function be set before each game in case the gamers have changed gaming gun during the break.

Instead of the master controller, teams can be also be configured during the initial boot process. Use the right button immediately after turning the gaming gun on with the key and then scroll through the menus using the trigger until you get to "Battle Modes". Then use the left or right buttons to select the right team or indeed turn friendly fire on before using the trigger to work through the rest of the menu options.

8.3   A Gaming Gun will not hit another one! (FLAT BATTERY)

The next thing to check is IF the battery is flat. Remember new gaming guns come with unconditioned batteries which must be conditioned before use. Conditioning involves performing a complete charge, discharge and full charge again.

To check the current voltage turn the gaming gun on with the key to see to voltage displayed on the 3rd line.

The gaming guns should work to down till around 5.5V. If the voltage is low, the LCD turns off.

If the gaming guns get too low, simply connect the gaming gun on the charger. **_Remember the maximum_ _power for recharging is 1amp._**

8.4   A Gaming Gun will not hit another one! (DON'T KNOW WHY!)

There can be a few causes for this.

Use the **target reset function** on the Master Controller to shoot all gaming guns and then re-try; this will correct any software settings that may cause the gaming gun not to take hits.

The first thing to check is to make sure both the shooting gun and the target gun are on the same "Battle".

Gaming guns on a different battle cannot be hit or hit another gaming gun in a different battle

The next thing to check is that all the gaming guns are configured as "Friendly Fire ON" (see 6.2 above). It is a good idea to use the sensor test function on the master controller to ensure the target gaming gun is accepting infrared messages.

Make sure also the shooting gaming gun has a well zeroed scope. If all else fails turn the gaming gun off, wait, then on again and see if it fixes the problem.

If all of the above fails to fix the problem, then try changing the head sensor with one from your spares kit.

My Master Controller radio functions have no effect.
The most likely reason for this is the Master Controller is configured to be on a different battle/game to the gaming guns.   Reboot the gaming gun and go through the menus access by the mode button to change the battle to the same as the target gaming guns.

The hit light can be seen but is dim all the time

This means there is moisture in the sensor.   However this should not cause any problem, the sensor will continue to work normally in all other respects.   The dim light will disappear when the sensor has chance to dry.

We used 2 way radios that had been rented and the hit feedback hardly worked

This is most likely due to using a radio that intrudes into the same frequency as SATR uses for the hit feedback.   Radio systems near the 433mhz band should not be used when SATR is being used in the same vicinity.   SATR is very RF friendly to other devices, if the channel is busy, it will not transmit and therefore all radio functions including hit feedback will cease. Infrared functions like shooting will continue to work without the hit feedback.

The LCD is blank yet the gaming gun appears to be working?

This nearly always means the battery is running flat.   The LCD will be the first thing to stop functioning when the battery is low.

My gaming gun will not toggle between automatic and semi-automatic fire

This is usually because the weapon emulation chosen does not support two modes of fire, refer to APPENDIX A – SATR Weapon Chart.

My gaming gun re-boots sometimes during play

This means there is some fault with the power supply, the gaming gun main board is not getting continuous power. Check all connections and if needed try replacing the battery.

8.5   *What are the recommended range settings?*

The range of a gaming gun is determined by the range configured by the user and also the type of lens assembly used.   A lens with a long focal length such as found on the Morita model, causes the beam be tightly focused increasing the range but making it necessary for the shooter to be more accurate. The diameter of the lens impacts the amount of infrared light collected by the lens and re-focused into a beam.

Gaming Gun Model	Lens assembly	Range Effect	Beam width
Morita	46/50mm lens with 165mm focal	Very Long	Narrow
Commando 2004 edition	50mm lens with 165mm focal length	Very Long	Narrow
Commando 2005 – 2012	50mm lens with 100mm focal length	Long	Standard
Commando 2013+ edition	46mm with 165mm focal length	Very Long	Narrow
Scorpion/Cobra/P90/Spitfire	40mm lens with 100mm focal length	Medium	Standard

The software settings establish how much current flow goes to the infrared LED -- the more current; the longer its range.

The range categories in ascending power are indoor (set by using the indoor mode), short, medium and long.

To minimise infrared bounce and sometimes to provide game balance between different weapons, ranges other than long are sometimes appropriate.

Terrain	Recommend range settings
Indoor with line of sight generally less than 30 metres	Indoor
Indoor with line of sight over 30 metres	Short
Jungle, medium forest and dense forest	Weapon Defaults
Light Forest, open or outdoor urban	Long

8.6   How do I zero my Gaming Gun?

Battlefield Sports recommends that each gaming gun needs to be zeroed once per week. SATR requires the scope to be better zeroed then the classic system so that the sensor receives a clear error free digital signal.

Zeroing is best done with an infrared camera connected to a black/white monitor. A target sheet showing the distance above the beam the red dot or cross hair should be located is available for download from the online BFSU. The most important thing to take into account is that the scope is above the lens assembly where the infrared beam comes out, therefore the scope must be zeroed to be this distance above the beam and when a gamer is aiming they also need to aim this much above the sensor.

8.7 Common Error Codes

Error Code	Error

[USER GUIDE FOR SATR CODE V2.4C+]

101	Failed to initialise SD Card
102	SD card disabled
103	SD Card (Try pushing the SD card back into place)
106	RF module Error
108	RF Module Error
201	RF Module Error
T.O	RF Chip timeout

9 Glossary

Term	Definition
3 Second Countdown	This is a state that allows a player to move away from the start point without shooting or being able to be shot for 3 seconds. It also loads the audio files if necessary and resets the game variables such as restoring full hit points and ammunition and resetting game stats.
A zeroed gaming gun	A gaming gun that shoots accurately on first trigger pull when correctly aimed. The gun is hitting the target indicated by the Red Dot or Cross Hair scopes by aiming above the sensors the same distance the lens is below the scope
A	Is for Team A. A weapon assigned to team A cannot be hit by other weapons on team A. A is short for Alpha team.
A%	Accuracy Percentage. A% = (hits + kills)*100/ Shots Fired. It could be the accuracy percentage for the current game or the entire session.
AO	Area of Operation. This has a military term and can be used in situations where it is clearly explained to the customer or where the group is familiar with the term – this is the area of play bounded by defined boundaries.
A/W	Short for Assist to Wound ratio. An assist is a successful hit on an opposing player. A wound is a hit on this player that reduced the HP value including a hit that caused this weapon to enter dead state.
Ammunition Box	A device role that restores the number of reloads left back to the starting value configured for the target gaming guns. An ammunition box can be assigned to a team so only that team gets reloads. The Ammo box can be configured to provide a limited number of reloads or time limited reloads. It shows how many reloads have been done, confirmed by RF feedback on the LCD.
Armor Box	A device that upgrades target gaming guns to a new maximum hit point value and will also affect the current hit point value. Typically an armor box is configured to only work on a specified team. If the maximum hit points is raised, then the current hit points should increase the same amount, similarly if the maximum hit points is reduced, the current hit points should also be reduced (which may result in the unit entering dead state).
B	Means this device is on team B. Weapons on team B cannot be hit by another weapon on team B. Also known as Bravo team.
Battle	SATR supports up to 4 independent battles in the same general vicinity. Each battle is RF and IR isolated from each other. For example a master controller on battle 1, will not start or end a game on battle 2. A gaming gun on battle 1 cannot hit or be hit by gaming guns on battle 2, 3 or 4.
Battlefield LIVE	Live combat simulation game for entertainment directed at Teen and adult gamers & corporate events.
Beginner's Live Play	Introductory mission that has simple objectives and rules with lots of re-spawns
BFSU	Battlefield Sports University. This is online and is password protected for access by field owners.

[USER GUIDE FOR SATR CODE V2.4C+]

Check List	A list of equipment, materials and/or actions required on a post for the staff member to check off each time it is done to ensure nothing is missed
Clear Stats Command	This is a master controller radio command that clears all the session stats back to 0.
Claymore	A type of mine normally remotely detonated.
Clan War	Tournament played for trophies and/or prizes.
C.O.	Stands for Commanding Officer – a staffer who is supervising the event. It is a trained Staff Member who oversees operations from the time of leaving the warehouse to return to the warehouse and supervises other Staff
Code	Software version installed on the device. This is shown on the initial boot screen.
Combination Box	Or Combo Box for short is a combination of medic box and ammunition box. Respawns are triggered using the trigger switch and the reloads are triggered by pushing the reload switch.
Configuring a Gaming Gun	Using the display to set up a gun with various "lives", "sounds" and delays (refer to chapter 3 of this user guide)
Controller	Short for master controller
Cure Box	A device configured to perform cure of the Zombie virus on the Apocalypse version.
Deactivated	This is the Laser tag terminology for when the gaming gun is in a dead state.
Death Match	This is a game where players make up two teams. There are unlimited re-spawns & a set time. The team with the least number of re-spawns WINS! Also called "team death match"
Default (Range)	This means the infrared range (power) will be determined by the range setting of the current weapon emulation unless the device is in indoor mode.
Device Role	Any SATR device can be configured to operate in any role such as weapons, medic boxes, radio repeaters... The Device Role is what this unit is currently configured to do.
Difficulty Level	SATR supports 3 difficulty levels – "Easy", "Standard" and "Hard". In "Easy" mode, the sensor will only accept hits at a maximum rate of once per 2 second and if red dot control is normal, will keep the red dot on when firing. "Hard" will accept a hit once every ½ second and in Standard, every second. "Hard" and "Standard" mode with normal red control use the recoil from the weapon emulation.
Ding	If a team B player changes control of the domination box, then the a Ding sound will be played on the shooters gaming gun.
Dirty Mine	A special type of mine that when it detonates it keeps firing every second. It will explode for 20 seconds and make a distinctive Geiger counter while detonating.
Domination	This is a game where players make up two teams. There are unlimited re-spawns & a set time. The Domination Box will track the number of times each team has "dominated" or

	taken control of the box. The clan with the most number of "owns" WINS!
Dom Announcements	This is how frequently during the game, a Domination box annouces by SFX which team is in control. Disabled means it makes no annoucements. 5 seconds should be the default. There are sound files in each supported language annoucing which team is in control and also which team was victorious. The system should play the SFX indicating which team won 5 seconds after playing the game over sound.
Domination Box	This is a device role to enable domination style games. A domination box keeps track of how much time each team has been in control of the objective during the current game. When the game ends, it will flash the colour of the winning team and show which team won and by how much time on the LCD. Typically control is indicated by shooting the infrared receiver which provides the team ID. However the box can be configured so control is indicated by pushing the buttons – reload for A team and mode switch for B team. If the button is pushed in either mode, the LCD backlight comes on for a few seconds.
End (Radio)	A radio command from a master controller that sends devices on the same battle into game over state.
FA	Fully Automatic. The normal mode of fire of an automatic weapon which unless it jams will keep firing until the trigger is released, the unit is hit/killed or runs out of ammunition in the current magazine.
Freq. Of Zombie SFX	If Random Zombie SFX is enabled, this defines in seconds how often the Zombie sound should be played. This can have settings of 10, 20, 30, 45, 60, 90, 120, 180 and 240 seconds.
Game Stats	This screen shows the stats from the last game including hits, kills, accuracy percentage, A/W, K/D and O.
Gaming Gun	A SATR device configured as a weapon. Normally this is one of the range of Battlefield Sports gaming guns listed on www.battlefieldsports.com
Game Timer	A game may or may not have game timer. A gamer timer can set by a master controller for all devices on the same battle as the master controller. An individual device can be assigned a game time by a master controller. A weapon can also be assigned an individual time from game start during the on boot configuration process "Fixed Game Time". The time left will be shown on the LCD display of each unit in weapon mode during a game. When the time reaches 0 the unit goes into game over state.
Health	Also known as hit points. It is how many more hits the gaming gun can receive before going into dead state.
Hit	A hit is when an opposition's gamer's sensors are hit by another player's fire. It registers an "ouch" sound effect each time and reduces the hit point counter by 1. Also known as a tag when using the Laser Tag language. It is not a hit if the

	incoming signal is rejected due to being on a different battle, is on the same team or the time since the last hit is too short.
Hits	How many hits made on an opposition gaming gun. The letter H is used on the LCD. If the language is Laser Tag this changes to T.
Hit Light	A coloured LED, typically on a sensor board that flashes when the device is hit (and this hit caused a HP reduction) or receives an IR command. It also flashes the current hit light colour for a few seconds during the initial boot sequence.
Hit Points	This is a measure of health. Once this drops to 0 enters dead state. A successful hit from another gaming gun reduces the hit points by 1, unless they are on killing mode, then the hit points are reduced to 0.
Indoor/Outdoor	Indoor means the IR range is heavily reduced, less current is sent to the IR emitter. Outdoor mode means the IR range is longer and it then users the range setting of Short, Medium or Long to determine how much current flows to the IR emitter.
Interrogate	A master controller command that sends an infrared signal to a device and the device then sends back to the master controller for display key configuration and statistical values from that device. It will return the device role in all cases. For a medic box how many respawns it has done. For an ammunition box how many reloads has it done.
IR	Infrared – use of IR indicates the communication is by one way infrared message packet.
IR Commands	Short for infrared commands. Some master controller commands work on target devices by direct line of sight infrared commands.
INV	Invulnerable. This is a special hit point value that means the SATR never enters dead state but still processes hit normally. The current hit point is never decremented and just says INV instead of a hit point value on the display. This mode can be useful for testing purposes.
Jam Weapon (IR)	A master controller command that causes target gaming guns to be "jammed". Jammed gaming guns will be cleared by using the reload button.
K/D	Short for Kill to Death ratio. A kill is a hit that caused the target gaming gun to enter dead state. A death is when this gaming gun entered dead state.
KILL (IR)	A master controller command that sends a target gaming gun into dead state regardless of the current number of hit points the target gaming gun has.
Kills	The number of hits that caused the target to enter dead state. The LCD shows this as K for kills. In Laser tag language on, the term is deactivations and the letter D is used on the LCD
Language	SATR requires multi-lingual support. This field defines what current language is used for any spoken phrases. US English – Female (*default*) US English – Male British English – British,

	Arabic Mandarin, German, French, Italian, Japanese, Portuguese Russian, Spanish, Arcade, Laser Tag (display settings to Laser Tag terminology), Custom
Laser Skirmish	This is a phrase we coined to describe army parties in the forest.
Laser Tag	When the language setting is Laser Tag the terminology on the display remains in English but uses softer terminology. Laser Tag is usually associated with a sci-fi theme. For example instead of H and K for hits and kills, the letters T and D are used for tags and deactivations. The term gun changes to phaser. The sound effects for making a hit, kill, dead already and re-spawning all change when Laser Tag language is selected.
Live Play	The script for a live action scenario, including mission objectives, descriptions of scenes, conceptual situation maps and props (such as which gaming guns will be used), and if relevant, team backgrounds. Live-Play is a combination of theme and plot usually with specific mission objectives for the teams involved. A typical Live-Play includes victory conditions, suitable terrain, length of game, hit points, re-spawns and sometimes special rules and weapons. The most popular Live Plays are specified in our Basic Games Handbook.
Live Play Briefing	The C.O. briefs the gamers on gaming gun operation, safety rules, and the missions to be played in a particular session.
LCD	Back light liquid crystal display with at least 4 lines of 16 characters.
Limited Reloads	A combination box or ammunition box can set to perform a limited number of reloads before the box is considered empty.
Limited Respawns	A medic or combination box can be set to limited respawns. This is the number of respawns this device can do before the respawns are expired. Note that a trigger push on a medic or combination box does not count as a respawns. However one trigger push may generate 0, 1 or many respawns using the RF feedback to count the number.
Lock	This is used to lock the person turning on the device from some or all configuration settings or to provide a limited set of functions. To exit a device from lock mode can be done either by a target reset command, unlock command from a master controller or by pushing the reload button ten times in a row without any other trigger or mode button push, followed by 10 mode button pushes, followed by turning the unit off and on again. When using the mode buttons to unlock the domination sound is played after 10 reload button pushes in a row and 10 mode button pushes in a row
LMG	Short for "light machine gun", generally air cooled machine guns that can be carried and utilized at the squad level by infantry. LMGs are usually bipod mounted. LMGs are prone

	to overheating and therefore cannot sustain continuous fire for extended periods.
Magazine	Generally firearms have ammunition stored in magazines. By inserting the magazine into the firearm that effected reloads the weapon. Sometimes the term clip is used instead of magazine.
Master Controller	A SATR device configured as a master controller for use by the staff running the event. Used to configure gaming guns and other devices as well as control the games. The master controller uses IR and RF commands.
Medic Box	A device configured as a medic box provides respawns when the player who is in dead state pushes the trigger switch. The back light LCD should come on for 3 seconds after any button is pushed. A medic box will only work on players from the same battle as the medic box and if a medic boxes is configured to a particular team (usually done by the SET team function from a master controller), it will only re-spawn players on the same team.
Mission	A particular game of Laser Tag usually with some sort of team objective
Mode button	This is generally a black button positioned right of the trigger.
Mystery Box	A device role that sets target gaming guns to a random weapon class and then random weapon emulation within that weapon class. It may be configured to work for only a particular team or just a random weapon emulation from within the current weapon class.
Mystery-Class(IR)	A master controller command that causes target gaming guns to change weapon emulation to a random selection within the current weapon class of the target.
Mystery-Rand(IR)	A master controller command that causes target gaming guns to change weapon emulation to a random selection. The weapon emulation can be from any class.
Muzzle Flash	The LED's that flash when a gaming gun is firing. MP5SD do not trigger a muzzle flash when attacking. The muzzle flash can be disabled or colour changed for any weapon emulation.
New Mission IR	A master controller command that will restart the mission on target gaming guns. This will give them full health, full ammunition and reset the game stats. Will also restart cure box, medic box, ammunition box, domination box and combination box.
NATO Wounds	When a trainee dies, instead of saying dead, the LCD indicates where the wound is and severity which is randomly generated based on the hit location.
O	Short for Objective on the LCD display. It is the number of times this gaming gun during the last game hit the domination box causing the opposition timer to stop and the friendly timer to start or restart. Also referred to as "o" for Owned.

Pause	Temporarily freezes a device from performing its normal operations
Phaser	Alternative term for gaming gun used when the Language is set to Laser tag.
Radio Repeater	A device that retransmits some RF signals regardless of battle. The repeater messages are Start, End, Pause and Resume
Range	The power of the infrared beam. Range setting are indoor, short, medium and long.
Rearm time	The amount of time that has to elapse after a detonation of a mine before the mine can be detonated again
Red Dot Control	Defines the behaviour of the red dot scope during play. OFF: The red dot only flashes when a hit or kill is made on a survivor. It will flash twice when a hit is made and 4 times when a kill is made. ON: Red dot remains on at all times and does not disappear when a shot is fired. NORMAL: Red dot remains on all the time if difficulty level is Easy. It disappears for a short period after each shot in Standard and Hard difficulty level. The amount of time off = Recoil value of current weapon emulation * 0.5 in seconds. If recoil value > 0 then during fully automatic fire, the red dot remains off from the time the burst started until the last shot fired plus weapon emulation * 0.5 seconds
Reload	To provide ammunition. A reload by pushing the reload button on a weapon assuming any reloads are left beings the restores full ammunition to the current magazine. A reload from an ammunition box restores all spent magazines and makes the current magazine full.
Reloads	The number of spare magazines this weapon is carrying. There will be the current number of reloads and the maximum number of reloads show on the LCD in ready state.
Reload button	Generally the red button on the left side.
RF	Indicates communication from device to device is done by digital radio communication. The RF needs to take into account the fact that at any one time there can be many RF signals so the system has to queue signals when the channel is busy.
Re-spawn	A process of bringing a dead gaming gun back into the game. This is done using a medic box, combination box or respawns command on a master controller. In Laser Tag language this is called Reactivation.
Resurrection Time	The amount of time with apocalypse theme for a dead survivor to automatically turn into a Zombie and come back to (un) life.
Resume	Return to the last state the device was in before it received a pause command if the unit is currently paused.
S	Spawns. The number of respawns on this gaming gun during the current game.

[USER GUIDE FOR SATR CODE V2.4C+]

SA	Semi-automatic. One shot per trigger pull with the next round automatically loading into the chamber.
SATR	Small Arms Transmitter/Receiver covered by United States Patent No. 8,282,486 featuring real time peer to peer hit feedback by RF.
Session	Generally players play a series of games, generally staying on the same team for all games. A structured series of games with basically the same players involved is called a session.
Session Stats	This is the same as game stats except it is the totals for all games since this weapon was turned on or received a clear stats radio command.
Set Blu Team	A master controller command to resets the target device ready for hiring out for Laser Tag events. Muzzle Flash and Hit Lights will be set to Blue.
Set Red Team	Same as Set Blue Team except for muzzle flash Red, Hit Lights Red and team A.
Shoot the box	If Shoot the box is selected (Default) for a domination box then to change which team is dominating the players have to shoot the box (hit the IR sensor).
Spawn (IR)	A master controller command that respawns gaming guns that are in dead state.
SS	Single Shot, the weapon must be reloaded after each shot
Start (Radio)	A start command sent by digital RF to all devices on the same battle from a master controller or retransmitted by the radio repeater.
Stoppages	If enabled, then the weapon will randomly jam depending on its reliability. By default this is disabled. The jamming rate for the weapon emulation is the percentage chance that a single shot will jam the weapon. To un jam the weapon requires the reload button to be pushed. A unit cannot jam the 1st shot after reloading or unjamming.
Suicide Vest	A suicide vest was an option for a mine so that the player had no weapon but could detonate the mine. If the player was killed, then the mine is disabled.
Survivor	A term used in Zombie style missions to indicate a player that has yet to turn into a Zombie in the current mission.
Survivor Reset	A master controller infrared command to set all target gaming guns back to a working set of default values to suit a Zombie game where those gaming guns will initially be assigned to the Survivor team.
Target Reset	This is a master controller infrared command that resets all the configuration values back to a workable set for normal games. Language and current weapon emulation are unaffected.
Team	Generally gaming guns and sometimes devices are assigned to a team. Team assignment means they can't shoot their own team. Team X is unassigned and therefore can be hit by

	and hit anyone on the same battle. Allowable teams are A,B and X
X	Means the device is not assigned to a team. This is also known as Friendly Fire ON. Never mix in a battle gaming guns on team A and others on team B/A
Theme	The themes are normal, haunted and apocalypse. The later 2 themes are for Zombie games.
Time Limited	Respawns and reloads can be limited to certain amount of time since the mission start before they cease providing respawns or reloads.
Time Sync	A master controller command that transmits how much time left in a game by digital radio signal. Each device on the same Battle as the master controller when it receives this time sync starts or updates a game timer, when the game timer reaches 0, the device enters game over state. .
Trigger	The main trigger switch on a gaming gun. Can sometimes just be a button on many devices.
Unlock	A device unlocked means on boot with the key, the operator has full access to the configuration menus and with a master controller full access to all configuration and other functions.
Veteran	
Voice Feedback	This is the playing of a sound effect in the current language or in Zombie theme when the player hits or kills another player's gaming gun. This can be disabled on the configuration menu in weapons mode.
Warning Sound	If enabled, domination boxes, medic boxes, combination boxes and ammunition boxes play 1 minute, 30 seconds and 15 seconds to go sound effect. If on, these boxes also play the 1 minute to go warning sound when the change from game over state to ready.
Weapon Box	A device to provide new weapon emulation by infrared. This can be assigned to a particular team and a limit on the number of upgrades can be configured at boot.
Weapon Class	Generally the goal is for the physical device to be same category as the weapon emulation. The physical category is defined by the weapon class such as hand guns, sub machine guns... Only weapon emulations within the current weapon class are selectable. Also known as "Gun Class"
Weapon Emulation	Type of weapon that the SATR device is attempting to act like within the limitations of the physical hardware.
Volume	The sound volume from high, medium and low.
Zombie	A gaming gun configured to operate on the Zombie team trying to kill the survivors and turn them into Zombies as well.
Zombie Hit Points	When this weapon is currently on the Zombie team, this is the number of hit points they get whenever a new game is started or they receive a respawns.
Zombie Muzzle Flash	Colour of the muzzle flash when operating as a Zombie. Options are red, blue, white, none.

[USER GUIDE FOR SATR CODE V2.4C+]

Zombie SFX	This refers to the random playing of Zombie sound effects when the unit is operating in a Zombie theme like haunted or apocalypse. It can be turned ON and OFF.
Zombie SFX Frequency	If Zombie SFX is on and this unit is operating as a Zombie then this field determines how often the sound effect is played in seconds. Options are 5,10,15,30, 45,60, 120
<<MAIN MENU	On a master controller, pulling the trigger when <<Main Menu is displayed will take the user back to the main menu. Use the reload or mode buttons to move through the list of commands.

10 Laser Tag Terminology

In SATR different terms are used on the display and also on spoken sound effects when the sound scheme is set to "Laser Tag". Here is how to translate between normal modes and Laser Tag modes.

Standard Term	Laser Tag Alternative
Shoot	Tag
Kill	Deactivate
Dead Already	Deactivated Already
Weapon	Phaser
Submachine gun	Small Phaser
Rifle	Medium Phaser
Hand Gun	Tiny Phaser
Machinegun	Large Phaser
Spawn	Reactivate
Gun	Phaser
Firing	Tagging
Dead	Deactivated
Wound	Tagged
Hit	Tag
Battle	Game
Mission	Game
Reloading	Charging
Magazine	Charge
Reload	Charge
Gaming Gun	Phaser
READY DISPLAY LETTERS	
H	T
K	D
A (top line)	C

11 WEEE Regulations & Recycling

Discarded electric appliances are recyclable and should not be discarded in domestic waste. Please actively support us in conserving resources and protecting the environment by returning this applicant to collect centers, if available.