



## Full option card for R/C Tanks



## Operating & Installation Manual for card version 1.10

Note : **GREEN** text is Pro version only feature



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## INTRODUCTION

- The Italian Battle Unit Full-Option 2 (hereinafter referred to as IBU2) is a card that completely replaces the electronic systems in RC Tanks, allowing you to fight according to the standard IR Tamiya™ code, customize all the sound effects and use a 4-channel proportional radio (AM, FM or 2.4 Ghz) to drive the Tank.
- The IBU2 PRO offers some additional features compared to the base version, it allows you to:
- Controlling two additional servos dedicated to the traverse and barrel elevation (very useful function on tanks without rotating turret).
- User selectable 2 or 3 customizable sound effects (using 5 or 6-channel radio)

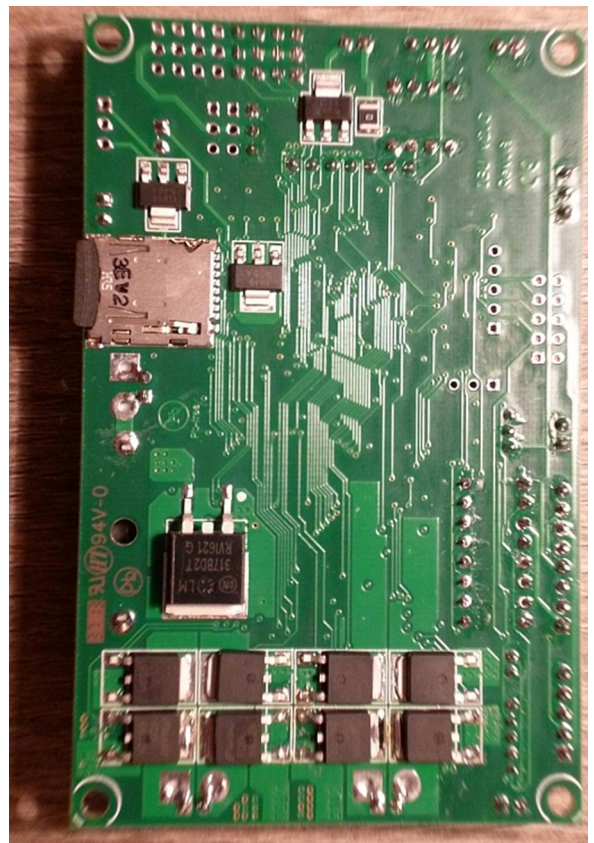
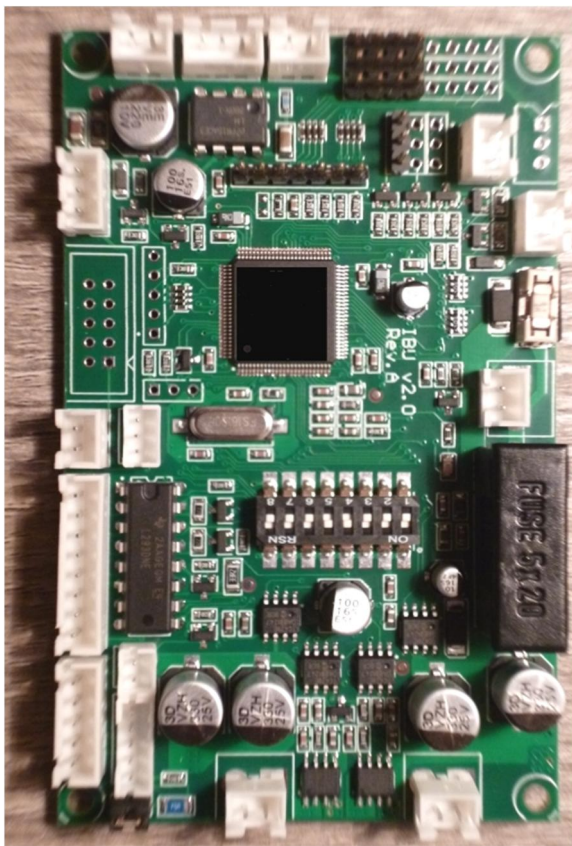


Fig. 1 - IBU2 top and bottom view

## FEATURES

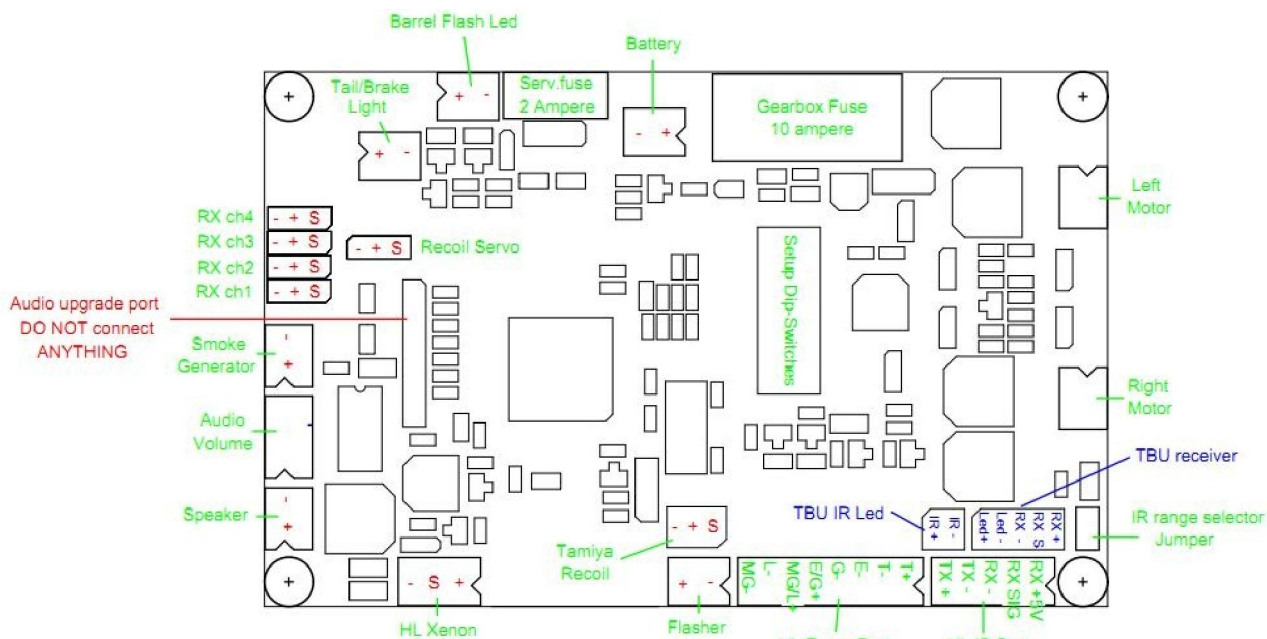


Fig. 2a - Layout of the IBU2 Base version

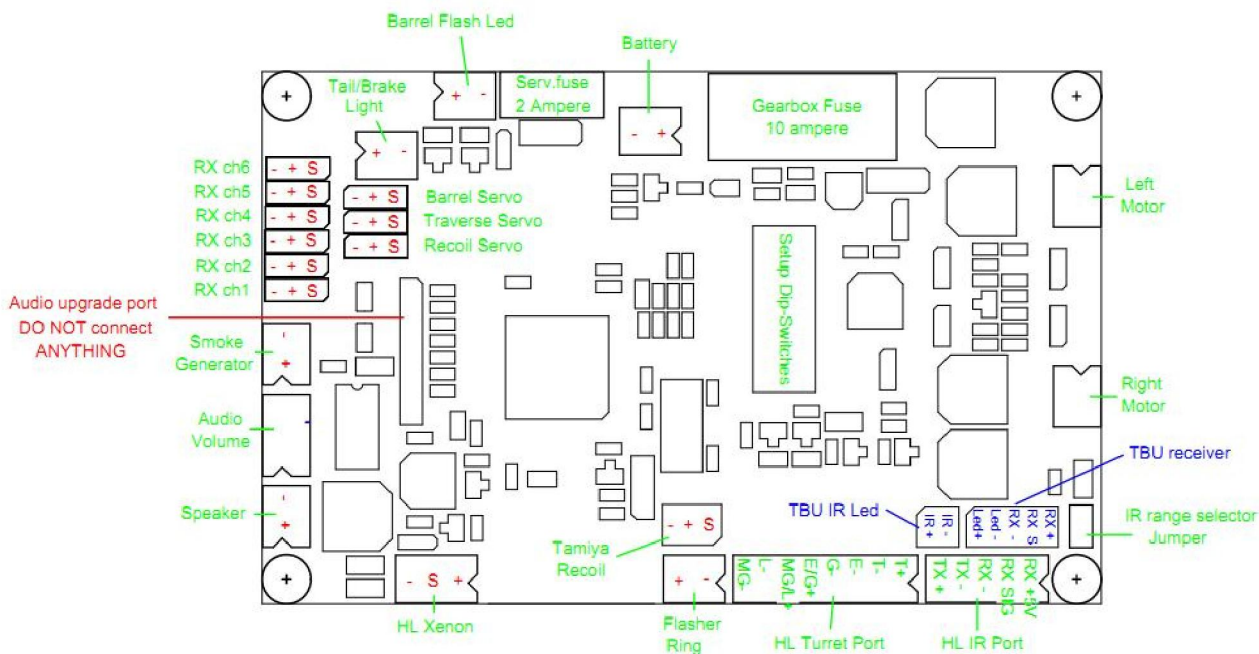


Fig. 2b - Layout of the IBU2 Pro version



HL Turret Connector Port

MG - Led machine gun

L - Front lights

G - HL Airsoft / Recoil

E - Main gun elevation

T - Turret rotation

The installation requires the disconnection of each cable from the card RX18, and its connection to the IBU2 according to the scheme of Table 1

The installation as a replacement for other electronics requires a good level of experience, so we recommend to perform it only with the assistance of the authorized dealer.

**NOTICE OF TERMINATION OF WARRANTY**

In the event of incorrect installation, misuse, neglect or custom installation.



IBU2 Connector	Connect the cable disconnected from the position listed below for the RX18 (Heng Long)	Connect the cable disconnected from the position listed below for the Taigen MFU
Jumper setting range IR	Used to set the range of the IR shot of 'normal' (jumper on) or 'short' (jumper removed for Recovery Tank)	Used to set the range of the IR shot of 'normal' (jumper on) or 'short' (jumper removed for Recovery Tank)
Right engine	CN7 M.R.	6 M.R.
Left engine	CN6 M.L.	7 M.L.
Battery	CN1 BAT	1 BAT
LED flash firing (2 poles)	Not Available	Not Available
Tail light / brake	Tank back-up lamp (only available on cards RX18 2.4 Ghz)	Not Available
Servo recoil	Not Available. See Fig 4a below.	Not Available. See Fig 4a below.
Servo traverse	Not Available. See Fig 4b below.	Not Available. See Fig 4b below.
Servo elevation	Not Available. See Fig 4c below.	Not Available. See Fig 4c below.
Volume Control	CN4 VR	4 VR
Audio Speaker	CN5 SP	5 SP
Smoker	CN10 Smoke Unit	11 SM
Not require, switched via handset	CN11 Smoke Unit Switch	10 SW
Flash Xenon HL Xenon Flash	Combine the wires of the 5-pin connector of the original flash in a new 3-pin connector. See Fig 7 below.	Combine the wires of the 5-pin connector of the original flash in a new 3-pin connector. See Fig 7 below.
FLASHER Port	Not Available. For connecting hit indicator LED's	Not Available. For connecting hit indicator LED's
Turret control (traverse, elevation, firing), headlights and LED machine gun	CN9 Turret, Lift, Shoot, Lamp	9 Turret, Lift, Shoot, Lamp
HL IR port	CN2 IR Port	2 IR Port
Tamiya recoil	Not Available. For connecting Tamiya recoil mechanism	Not Available. For connecting Tamiya recoil mechanism
TBU IR Led	Not Available. For connecting Tamiya IR emitter.	Not Available. For connecting Tamiya IR emitter.
TBU IR receiver	Not Available. For connecting Tamiya IR receiver (Mushroom)	Not Available. For connecting Tamiya IR receiver (Mushroom)

**Table1 - Correspondence of connectors between IBU2 and RX18, Taigen MFU**

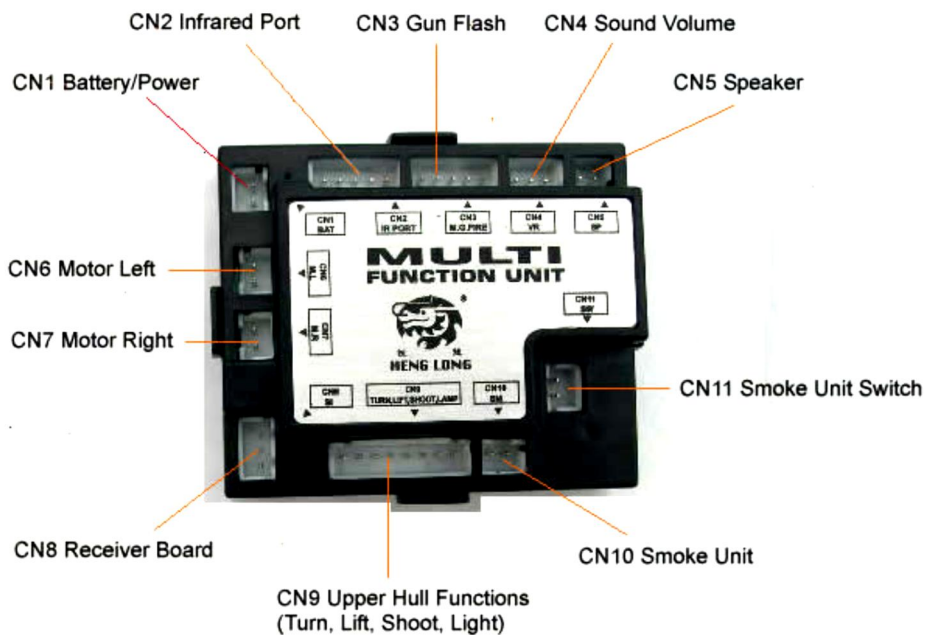


Fig. 3a - RX18 connectors layout

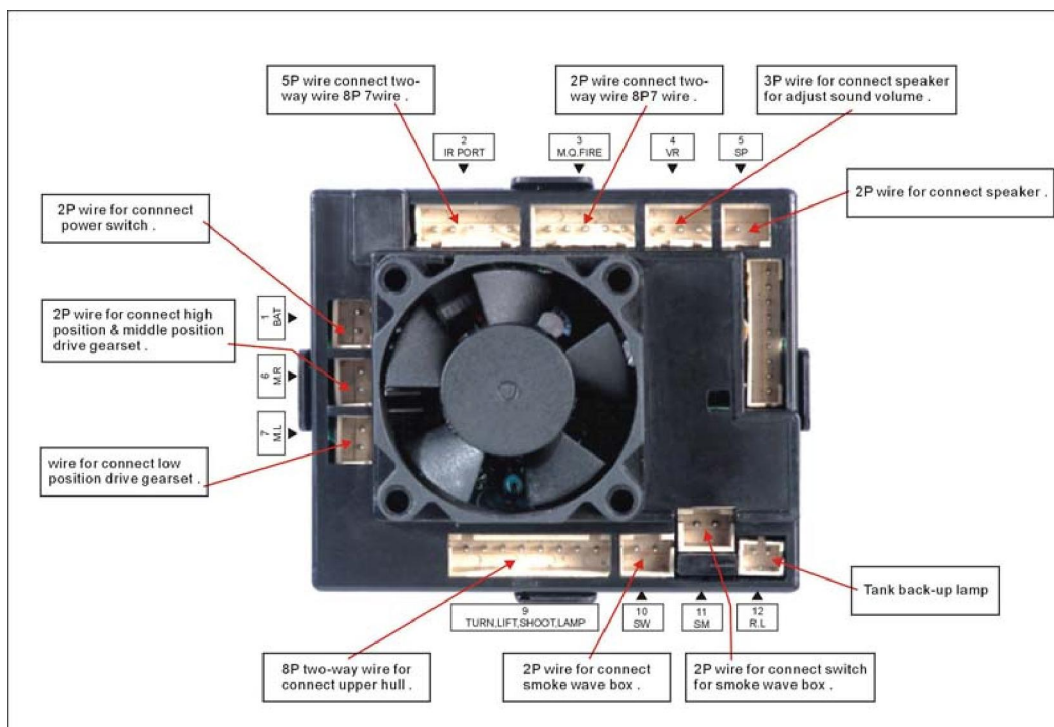


Fig. 3b – Taigen MFU connectors layout

## Tamiya or standard R/C servo recoil option

By connecting the Tamiya recoil in the "Tamiya recoil" connector, you can simulate the recoil of the barrel. In the same way, you can do it by means of a servo connected to the "Recoil servo" plug.

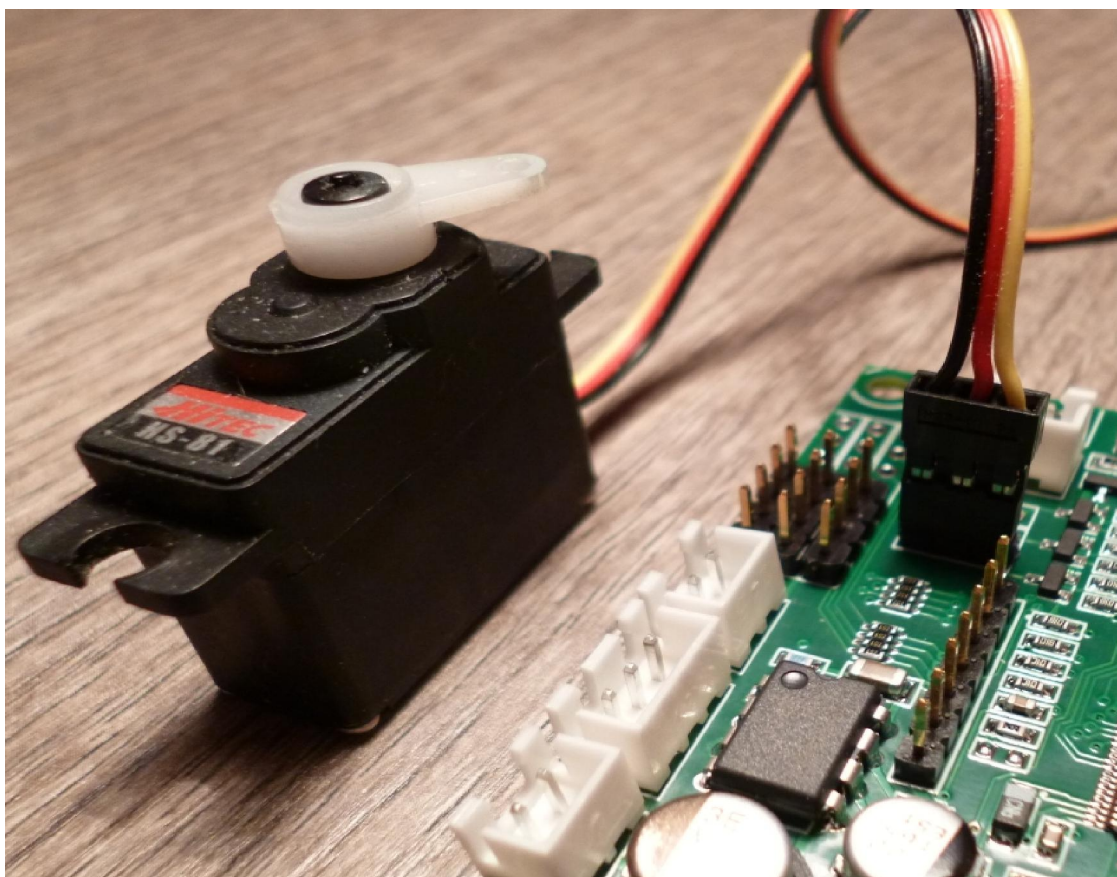


Fig. 4a – Recoil servo plug connected



## Ability to control RC standard servo for the movement of the barrel

Using the outputs "Traverse servo" and "Barrel servo" is possible control two servos used to raise, lower and swing the barrel, this option is useful on tank hunters as Jagdpanter or any tank without the turret.

The card also has the ability to control not only a standard servo but also a continuous rotation servo.

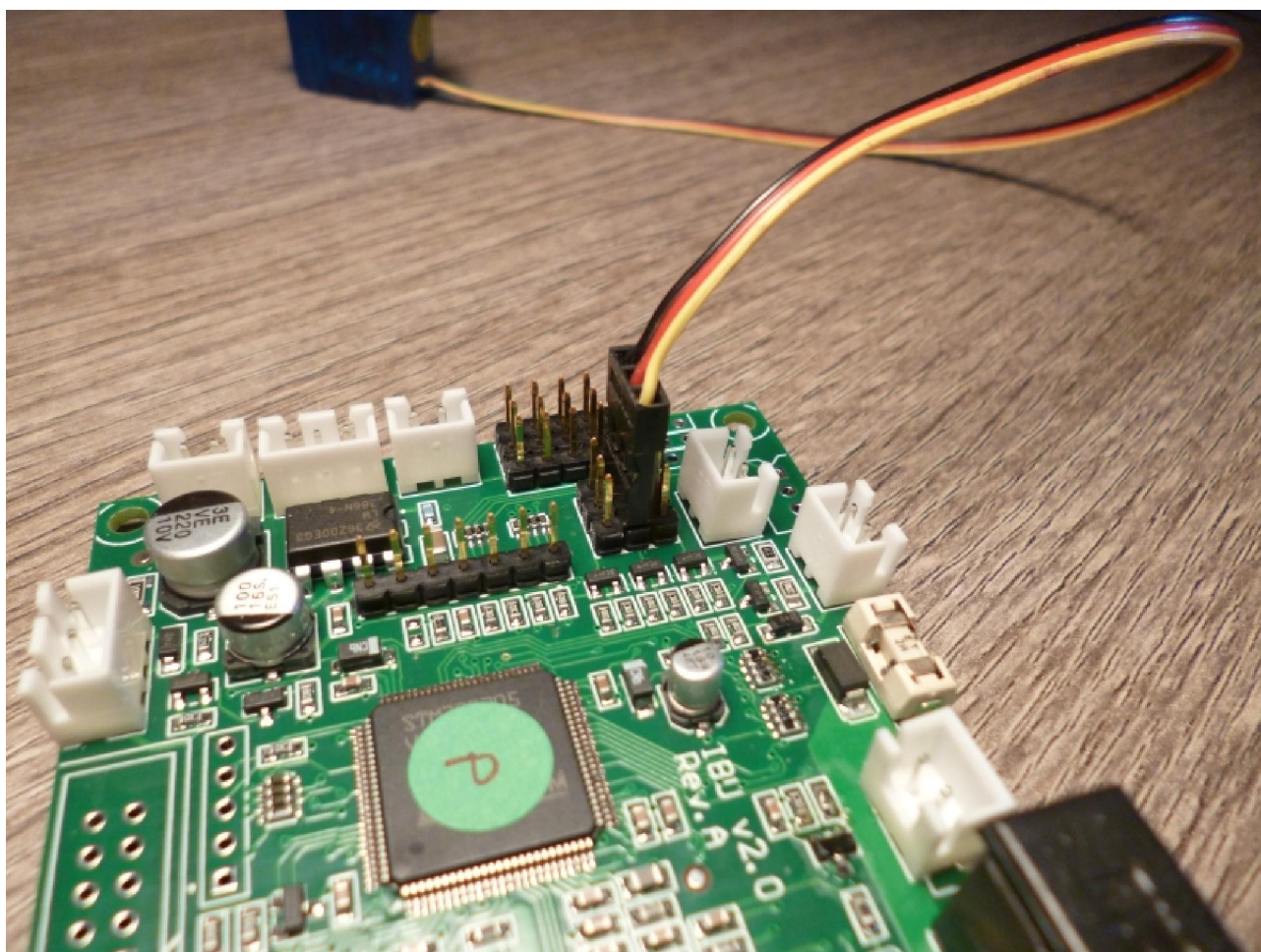
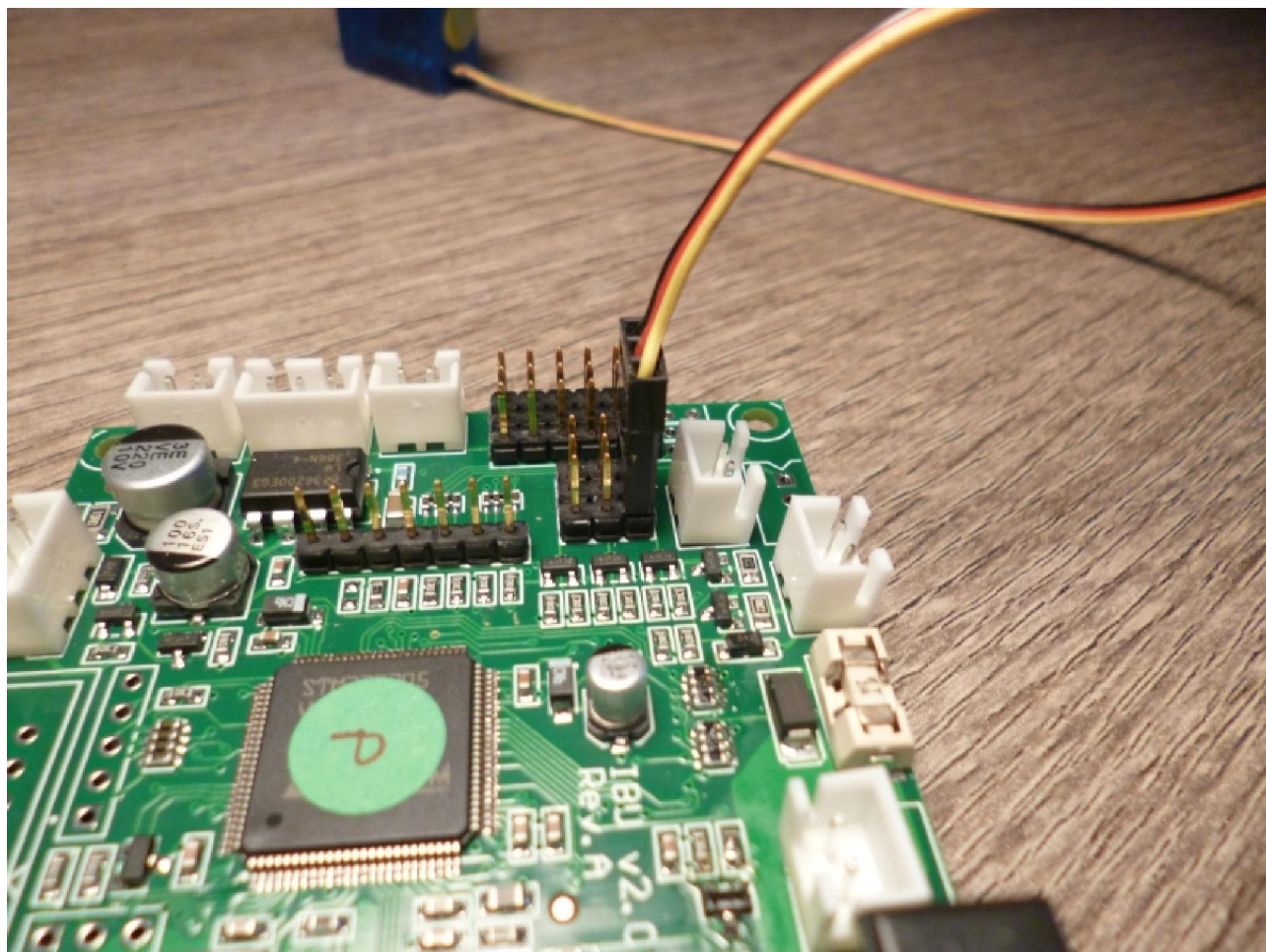


Fig. 4b – Traverse servo plug connected



**Fig. 4c – Barrel servo plug connected**

### **Voltage monitoring and Li-Po batteries support**

The IBU2 supports Li-Po batteries, monitoring continuously the voltage to prevent the over discharge. If the battery voltage falls to a value less than or equal to 6V, the Flasher output or the (optional) IR Receiver flashes. If the voltage drops again, the tank turns off the engine automatically. This function is used to avoid damaging the battery pack Li-Po that occurs when they are discharged excessively.

With the Pro card it is possible to use higher voltage batteries, it is essential you select the correct type with the dip switches to get the correct low voltage warning.

**For better performance we strongly suggest to use good Li-Po batteries**



## SETTING THE BOARD

Before installing the board some parameters must be set according to the tank type you plan to mount it. This is done using the settings described below.

The switch can still be moved even with tank on.

### IR shooting distance

The first is the jumper JP1: with the jumper on (default) the firing range for IR projector will be the maximum possible (battle tank), while the jumper is removed, the firing range will be limited to a couple of meters at most. This feature is to match the setting (by dip switch, see below) of the destination of the tank in 'recovery tank' ("Bergepanzer" in German), to avoid 'repair' unintentionally vehicles far away or even the enemy tanks!

### Tank function

Using the Dip switch 1 is set to the function of the tank, according to the scheme of [Fig. 5](#).

### Tank weight class function

Using the Dip switches 2 and 3 you set the class of tank (and its inertia, if enabled), according to the following table and diagram [Fig. 5](#)

Tank	Strength class
King Tiger (Tiger II)	Heavy
Tiger	Heavy
Pershing	Heavy
KV-2	Heavy
KV-1	Heavy
Elefant / Ferdinand	Heavy
Jagdpanther	Heavy
Panther	Heavy (also accepted Medium)
T34 / 76 / 85	Medium
Panzer IV F1 / F2 / J	Medium
Sherman	Medium
Stug III	Medium
Panzer III	Light (Accepted even Medium)

The table above is also adoptable for versions 'recovery vehicle' derived from the same tanks. (Eg. Bergepanzer III = Light).

## Extended signalling

It is possible to enable the extended signalling on the external IR receiver hit indicators (Status Indicator) by setting the dip switch 5 ON.

When enabled, the Flasher output, in addition to 'Hit received' (LED blinks for 2 seconds) and destroyed tank (LED blinks for 15 seconds), also the following information are given:



5 flashes followed by a pause to indicate the overheating of the drive unit, in this condition, the engines are not enabled until the temperature returns to normal.



4 flashes followed by a pause, indicating the absence of valid signals from the transmitter.



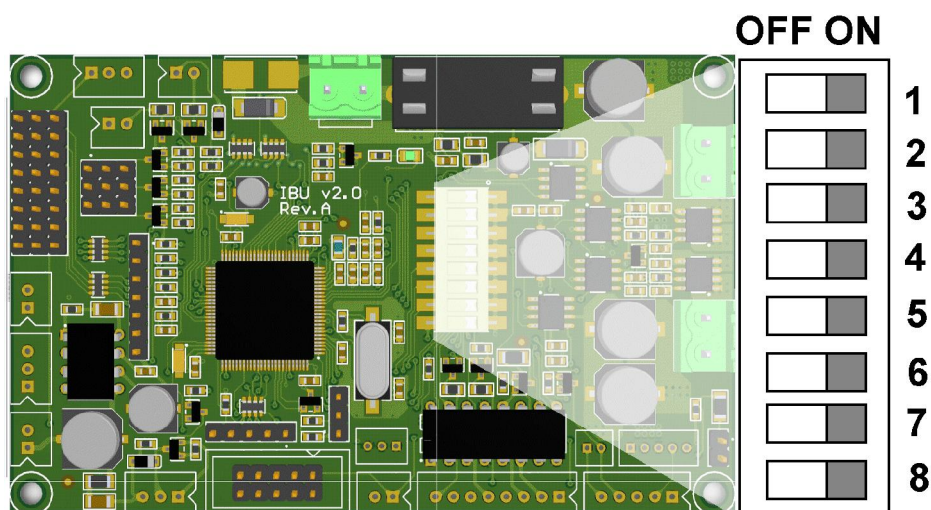
3 flashes, followed by a pause to indicate over-current drain of the drive unit, in this condition, the engines are turned off for 15 seconds.



2 flashes, followed by a pause to indicate low battery.



1 flash, during the battle, at the end of cannon reload time.



**Fig. 5** Setting the DIP Switch

<b>Function of the tank:</b>	<b>Switch no. 1</b>	
Recovery tank (berge) (1)	ON	
Battle tank	OFF	
<b>Class wagon:</b>	<b>Switch 2</b>	<b>Switch 3</b>
Ultralight (1 life)	OFF	OFF
Light (3 lives)	OFF	ON
Medium (5 lives)	ON	OFF
Heavy (9 lives)	ON	ON
<b>Battery type</b>	<b>Switch 4</b>	
Li-Po (*)	ON	
Ni-Mh or Ni-Cd	OFF	
<b>Extended signalling</b>	<b>Switch 5</b>	
Extended	ON	
Basic	OFF	
<b>Number of radio channels</b>	<b>Switch 6</b>	
4 or 5 Channel	OFF	
6 Channel	ON	
<b>Battery voltage</b>	<b>Switch 7</b>	
3S LiPo, 8/10cell Ni-Mh or Ni-Cd	ON	
2S LiPo, 6cell Ni-Mh or Ni-Cd	OFF	
<b>Programming Mode</b>	<b>Switch 8</b>	
Transmitter stick programming	ON	
Normal mode	OFF	

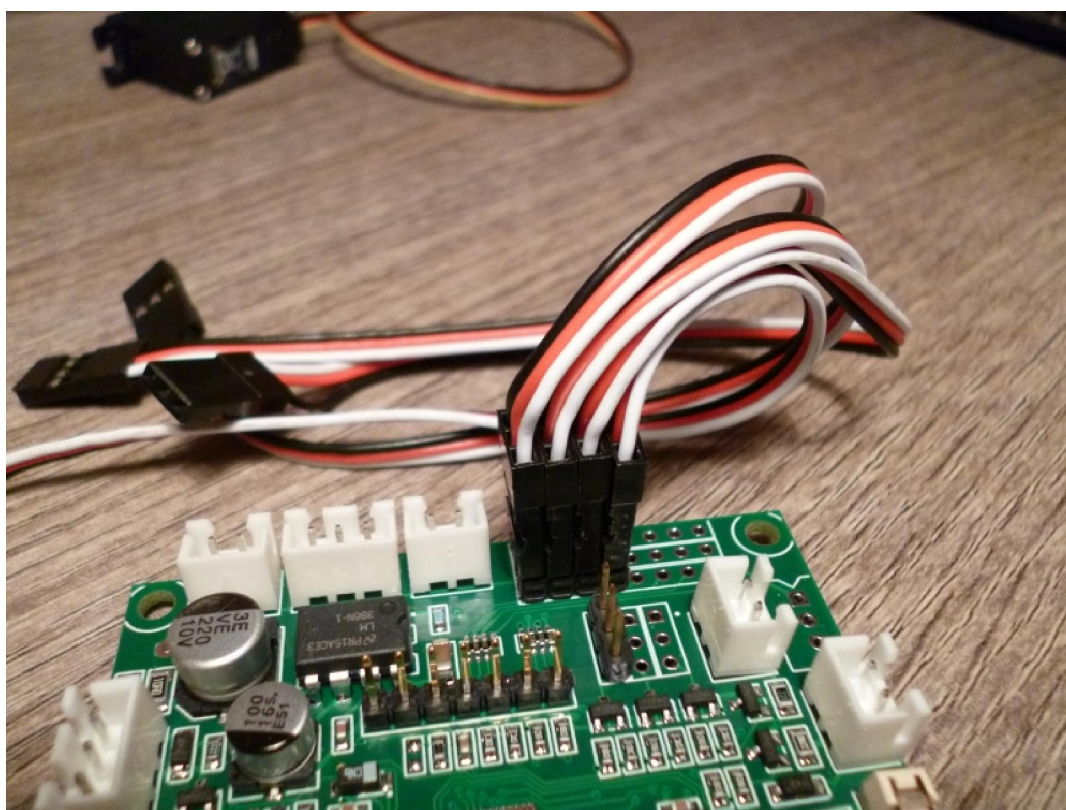
(1) must match the setting for Recovery tank (berge) by removing the jumper on JP1.

(\*) Support for Li-Po monitors the voltage of the battery pack (2-cell, 7.4V). When this drops to 6V the IR receiver LED (or Hit indicators) begin to flash if extended signalling enabled.

(9V when dip switch 7 is switch ON)

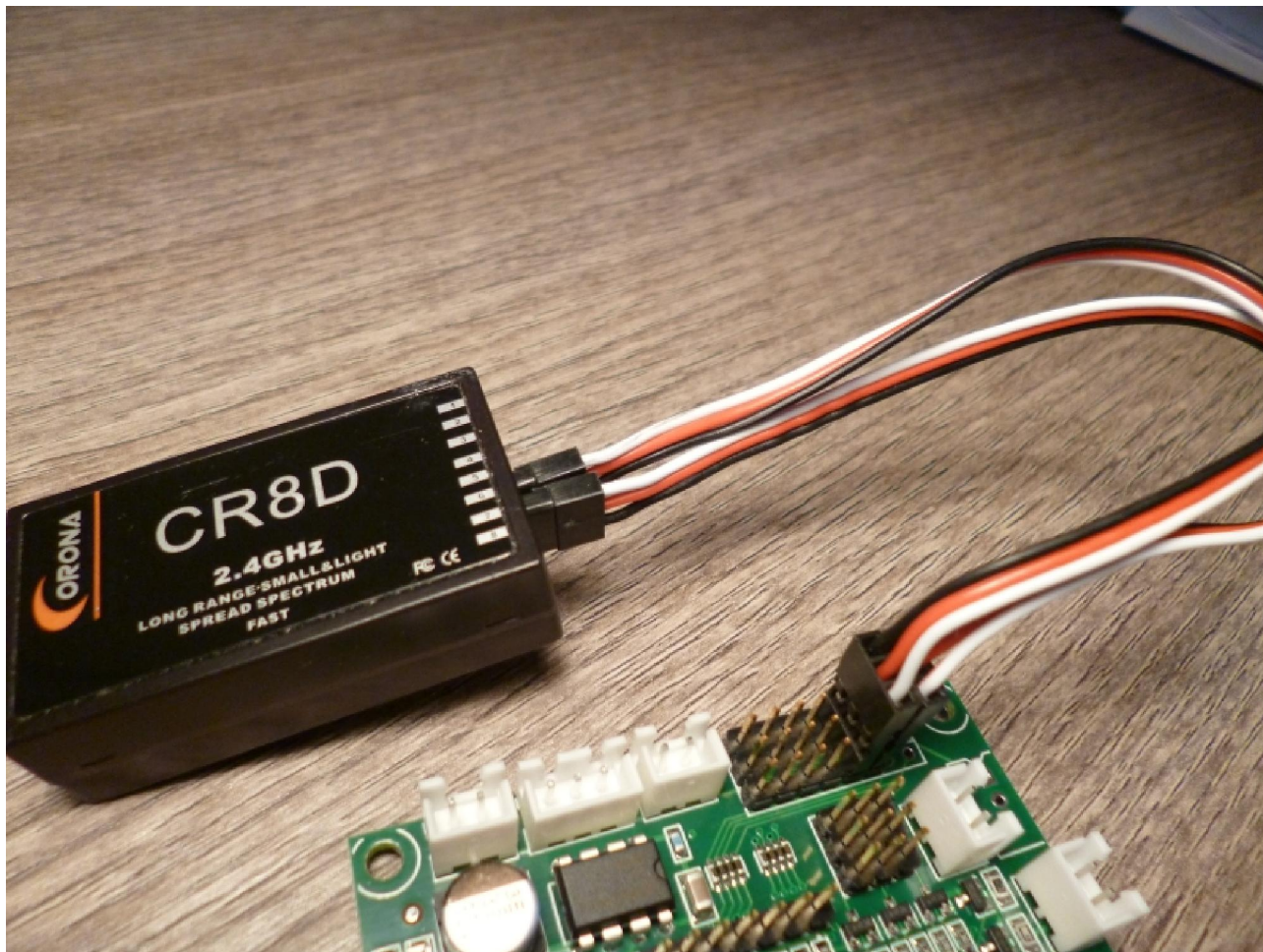
## Coupling the IBU2 to the receiver

- Connect the receiver as shown in Fig. 6a and Fig 6b and make sure you do not have reverse or reduction set (dual/rate) on transmitter channels.
- Turn on the tank and the transmitter.
- Wait until the receiver is aligned to the transmitter.
- Move the dip switch 8 to ON.
- Move both sticks to full position in all directions.
- Move the switches and / or potentiometers on the 5th and 6th channel.
- Move the dip switch 8 to OFF.
- The card is now configured for use with your transmitter/receiver setup.



**Fig. 6a Receiver Cables**

- 1 – Ch1, Throttle – Forward (accelerate) /Reverse (brake)
- 2 – Ch2, Steering – Proportional turn / Superspin
- 3 – Ch3, Gun shoot / Barrel elevation / MG
- 4 – Ch4, Turret rotation



5 – Ch5, 2 User sounds or Engine Start/Stop  
6 – Ch6, 3 User sounds

Fig 6b Connecting 5 and 6 channel receiver

## Adapting the Heng Long high intensity Xenon flash

The original HL xenon flash can be easily adapted to IBU2. Extract (with a pointed tool) the 3 wires coming from the original 5-pin connector and insert them into a 3-pin connector as shown in Fig. 7.

Then insert the 3-wire connector in the 'Xenon HL' port.



Fig. 7 Adapting the Xenon flash

## Use an alternative IR receiver

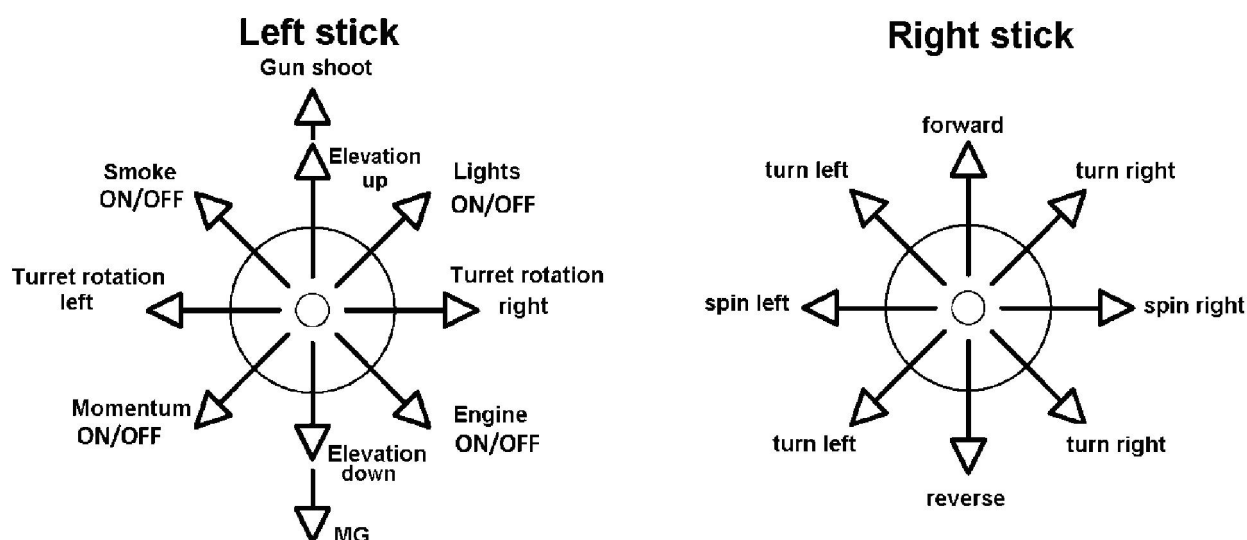
It is possible to directly connect a Tamiya™ or Impact™ IR receiver to the 'TBU receiver' port, thereby improving the range of the IR signals received.



## Tank control

### Movements

- Turn on the tank, the radio and wait for the flasher stops blinking and the headlights are lit steady.
- Try to rotate the turret or shoot, you should hear the sound of the manual rotation of the turret.
- Switch the smoke generator to ON if you want to use it, default is OFF to avoid to burn the heating wire in case of lack of smoking oil. The LEDs on flasher will flash once to indicate the insertion occurred.
- Start the engine of the tank (left stick diagonally down to the left for 5 seconds) and wait for the startup sound play until the engine sounds goes to idle.
- Try to drive the tank moving the right stick forward and backwards and right/left for steering. Check that the movement of the wagon correspond to the position of the stick.
- Try to rotate the turret with the left stick.
- If the tank moves in reverse direction, or if the turret rotation is reversed compared to the control you need to reverse its own channel on the radio, or change the parameter for the channel in the file "IBU2.ini" in the root of the microSD card inserted into IBU2 (see later section "INI file").



**Fig. 8 Stick commands and corresponding channels**

Note – Depending on the traverse motor wiring, the left stick controls maybe flipped left to right i.e. Engine ON/OFF bottom right.



Beside the basic commands, the following functions can be controlled by the transmitter:

- **LIGHTS CONTROL: left stick up/left** for 5 seconds to switch light on and off
- **SMOKE GENERATOR: left stick up/right** for 5 seconds to switch smoke on and off (when engine is running). Activation/deactivation of this feature is signalled by a blink on the flasher.
- **MOMENTUM (INERTIA SIMULATION) ON/OFF: left stick down/right** for 5 seconds to insert/remove momentum. Activation/deactivation of this feature is signalled by a blink on the flasher.
- **BARREL ELEVATION (up/down): left stick up/down (half way)**
- **MACHINEGUN (MG): left stick down (all way)**

### Battling

- Push the left stick to shoot: you can hear the 'boom' sound and see a muzzle flash led (if any in the barrel) and the IR battle system transmits its pattern signal.
- After shooting, for a time variable from 3 (light tank) and 9 seconds (heavy tank) it is not possible to shoot again (reload interval). At the end of the reload interval, the red LEDs of the Flasher (optional) blink once (1 sec), to let you know that the gun is reloaded and that it is possible to shoot again.
- When the tank is hit by a Tamiya compatible IR signal, the red LEDs of the Flasher stay lit for about 2 seconds, and the motors might be slowed according to Tamiya specification.
- One hit point is subtracted from the tank total.
- If the tank does receive the final hit, the IBU2 switches the tank off, the red led blink for about 15 seconds and the tank must be considered 'destroyed'. Afterwards, the 'rebirth' sound effect is played and the tank return to the starting condition.

### Repair tank

If DIP switches are set in 'repair tank' mode, the tank won't be able to damage the enemy. Instead, it will be able to restore the hit points of a damaged tank (provided it is not completely destroyed), if equipped with an IBU or IBU2, by "shooting" him in short range the repair code through the IR led.

When using this function, the repair tank stops moving for some seconds (according to its weight class, 3, 5 or 9 seconds), and it is vulnerable to enemy shoots. At the same time, the muzzle flash led blinks to simulate a soldering light, and the repair sound effect is played. After this time it can move again into safety and take cover.

The damaged tank, if reached by the IR repair signal, begins restoring its hit points (the process is signalled by fast blinking of the red LEDs), and it cannot move nor battle. One lost hit point is recovered every 5 seconds (the blinking stops for a little after each recovered hit point). During the repair, the relevant sound effect is played.

If during the repair process the tank is hit, the repair is interrupted with recovered hit points, and the tank recovers movement and battling ability (if the hit did not destroy it).

When setting the vehicle as 'repair tank', remove IR range selection jumper in order to reduce the repair range of the IR led to 10% of normal one. This, together with a proper positioning of the IR led, will allow to perform repair on intended allied tanks only.

**NOTE:** Lack of removal of IR range selection jumper will allow ability to 'repair' unwillingly even tanks very far from repair tank, including enemy tanks.



**NOTE 2:** the repair tank cannot repair itself.

## CHOOSE AND CUSTOMIZE SOUNDS

On the supplied microSD, soundsets for the most common tanks are supplied.

**Note:** To fully enjoy the better audio quality, it is suggested to replace the stock HL speaker with a better one of 4 ohm impedance rating.

To select the correct set corresponding to the tank you are putting the IBU2 on, proceed as follows:

1. With **tank switched off**, gently press on the microSD inserted under the IBU2 board to unlock it (**NOTE: DO NOT PULL THE MICROSD TO UNLOCK IT!!!**), extract it and insert it into a PC card reader (not supplied).
2. Browse to the microSD folder. Each folder contains a full set for the tank listed.
3. In the root of the microSD card are located the sound effects played by the IBU2. Each wave file is associated to a different function according to the contents of the IBU2.INI file:

Variable in the file IBU2.ini	Audio file	Corresponding effect
Cold Engine ON	estartc.wav	Starting a cold engine
Engine Warm ON	estartw.wav	Starting a warm engine
Engine Stop	estop.wav	Stopping the engine
Engine Idle	eidle.wav	Engine running at idle
Engine Rev Up	revup.wav	Engine revving up
Engine Rev Down	revdw.wav	Engine slowing down
Engine Step 1	es01.wav	Ramp 1 Engine
Step 2 Engine	es02.wav	Motor Ramp 2
...		
Engine Step XX	esXX.wav	Ramp engine XX
Squeak Type 1s	k01.wav	tracks noise 1
Squeak Type 2	sk02.wav	tracks noise 2
Squeak Type 3	sk03.wav	tracks noise 3
Squeak Type 4	sk04.wav	tracks noise 4
Squeak Type 5	sk05.wav	tracks noise 5
Cannon	50PZIII.wav	Firing cannon
Mg	MG34.wav	MG sound
TurretEngineOn	turn2.wav	Turret rotation (eng. on)
TurretEngineOff	turn1.wav	Turret rotation (eng. off)
Barrel	barrel1.wav	Barrel up/down
Hit	hit1.wav	Hit received
Dead	dead2.wav	Destroyed tank
Birth	PanzerI.wav	Tank rebirth
Repair	Repair1.wav	Tank repairing



4. To choose the correct set, just enter the chosen tank folder (e.g.. "Panzer III"), and copy all the contents into the microSD card root, overwriting the existing files. Verify the correspondence of the sound samples with the related variables into the BU2.INI file.
5. For a particular tank variant replace the pre-set samples with custom ones taken from the 'Engines', 'Cannons', 'Marches', 'Turret', 'Barrel', 'Hit' folders.
6. Extract the microSD card from the PC reader and reinsert it into the IBU2 slot until it locks, switch the tank on and test how the new sounds play.

It is also possible to replace any supplied sound by converting any sound effect or music into WAV format, mono, 22050 Hz, 8 bit. Each sample size must not exceed 1 Mbyte, or it will be truncated during reproduction.

Wav filenames are not important, until in the IBU2.INI file there is correct correspondence between each file and its sound effect, **but each filename must not exceed 8 characters** (plus the ".wav" extension) and cannot contain empty spaces or periods.

E.g..

"MG34_LONG.wav"	<u>NO</u> , not good (9 chars);
"MG34LONG.wav"	YES, good (8 chars);
"MG 34.wav"	<u>NO</u> , not good (5 chars but there's a space);
"MG.34.wav"	<u>NO</u> , not good (there's a period in the middle).

**Note 1** : some audio editing software cannot properly convert files into the required format, or they add some unwanted parts at the end of each sample, causing troubles to the IBU2. In case of problems, contact the board manufacturer.

**Also avoid reformatting the supplied microSD, since some O.S. do not format it correctly.**

**Note 2** : when changing the engine sounds with custom-made ones, there is no limit to engine rev steps (as per firmware V0.12) neither it is necessary to keep engine samples short, until all steps are correctly addressed in the IBU2.INI file. The IBU2 will automatically pick the defined steps and play them accordingly.



## FILE "IBU2.INI" FOR BASE VERSION

In addition to the associations of the sound effects with the corresponding wave file, into the IBU2.INI several variables are present that allow you to customize some features of the IBU2.

### Configuration of the recoil servo for the main gun

The first configuration parameter is the following:

RecoilTimeServo = 4000; [1..9999] mSec

It allows you to set the duration of the movement of recoil, the indicated value (4000) is expressed in thousandths of a second, so this value is 4 seconds.

A lower value will decrease the moving time and vice versa, a higher value will increase.

The range of values allowed is from 1 to 9999 milliseconds.

The second parameter:

RecoilTimeServoReturn = 2000; [1..9999] mSec

Allows to adjust the return speed of the barrel in position, as previously, the value is expressed in milliseconds, also in this case the lower the value used the faster will be the return.

The range of values allowed is from 1 to 9999 milliseconds.

The third parameter:

RecoilInverseCmd = TRUE; TRUE / FALSE

Allows to reverse the direction of rotation of the actuator, useful function when there are problems of installation.

### Configuration of the control pulse for mechanical recoil

This parameter allows you to adjust the duration of the control pulse to the motor of mechanical recoil (Asiatam, Tamiya, HL) or Airsoft unit (Heng Long)

RecoilTimeDigital = 1000; [1..9999] mSec

In this example, the pulse duration is 1 second, a lower value will decrease the pulse time and vice versa a higher value will increase.

The range of values allowed is from 1 to 9999 milliseconds.

### Configuring the radio channel reverse

Each row is for a specific channel of the receiver, this function is used, if you are using an older radio (without memory), to avoid having to set up (if necessary) the reverse channels depending on the tank you are using

RadioCH1InverseCmd = FALSE; TRUE / FALSE

RadioCH2InverseCmd = FALSE; TRUE / FALSE

RadioCH3InverseCmd = FALSE; TRUE / FALSE

RadioCH4InverseCmd = FALSE; TRUE / FALSE

RadioCH5InverseCmd = FALSE; TRUE / FALSE

RadioCH6InverseCmd = FALSE; TRUE / FALSE

In this example, all channels have value FALSE This means that there is no reverse applied on the channels, i.e. the commands coming from the transmitter are shown in decoding circuit as well as transmitted.



### **Configuring the smoke generator**

In case you want to use the smoke generator, there are two configuration parameters:

SmokeInitialStatus = 0; [0 OFF – 1 ON]

This parameter allows you to set the generator status at tank startup.

(The generator can be turned on or off even from the transmitter)

In this example the value 0 (zero) means that the smoke generator is OFF when the tank is turned on.

The smoke generators have different characteristics from one model to another, so the parameter:

MinPwmSmoke = 50; [1..100]%

Allows you to determine how much power is supplied to the generator while the tank engine is idling.

With most recent HL smoke generators a value of 30 is enough to keep it running with the engine idling, unlike those of the old type you need a higher value (50).

The command is proportional to the position of the stick of the engine.

### **Configuring lights**

This parameter allows you to configure the status of the lights at tank startup

LightInitialStatus = 1; [0 OFF - ON 1]

In this case, the lights will be on at tank startup, entering the value 0 (zero) the lights will be off.

(The lights can be switched on or off even from the transmitter)

### **Configuration of the rear lights and brake lights**

The rear/brake lights, typically 1 led (eg. KV1 on) or 2 LEDs in parallel (Leopard 2), are fed from the same output, this is modulated to obtain a low intensity for the position lights.

The parameter : TailLightIntensity = 50; [1..100]%

Allows you to adjust the brightness of the rear lights, a lower value will decrease and vice versa a higher value will increase.

Since braking output is modulated at 100% if you use a value very close to this (100%) for the rear position lights the braking effect will be barely visible.

The following parameter allows you to adjust the time the brake lights when you make a braking:

BrakeDuration = 500; [100..5000] mSec

The range of values allowed is from 100 to 5000 milliseconds.

### **IMPORTANT**

The brake lights effect is present only when the inertia is activated because in this case it becomes necessary to use the brake to operate properly.



### **Configuring the maximum current supplied to the traction motors**

Parameter: CurrentMotorTreshold = 10; [1..15]

Allows you to adjust the threshold of the current protection.

The default value is 10 amperes (for each motor) it is possible, in case of use of particular gearboxes or very heavy tanks, to increase up to a maximum of 15 amperes the current supplied to each motor.

### **Configuration of the power delivered during the SuperSpin**

The parameter: PowerRotation = 50; [1..100]%

Allows you to adjust the power supplied to the motors during SuperSpin and therefore also the speed of execution, a lower value will decrease and vice versa a higher value will increase.

### **Configuration of the power supplied to the motors**

The parameter: PowerMotorScale = 100; [1..100]%

Allows you to adjust the total power supplied to the motor during running, this function accurately calibrate the speed of movement to get closer to the dynamics of the real tank, a lower value will decrease and vice versa a higher value will increase.

### **Configuration of inertia (momentum)**

The parameter: InertialInitialStatus = 0; [0 OFF - ON 1]

Allows you to configure the inertia status at tank startup.

(The inertia can also be enabled or disabled from the transmitter)

### **Configuring the shaking of the tank when firing the cannon**

The parameter: TrackRecoilTime = 100; [0 ... 1000] mS

Allows you to set the functionality and duration of the movement, from 1 millisecond to 1 second.

The simulation of the shaking of the tank is done via the activation of the motors with a short pulse. To disable the function, simply enter the value 0.

The parameter: TrackRecoilSpeed = 100; [0 ... 100] %

Allows you to set the motor speed during the track recoil, from 0-100% (mild to severe)

### **Configuring the maximum reverse speed**

The parameter: ReverseSpeed = 50; [1 ... 100]%

Allows you to limit the speed when going backwards.

To disable the function, simply enter the value 100.



## FILE "IBU2.INI" FOR PRO VERSION

In addition to the settings for the basic version of the card, the following configuration strings allow you to configure the additional features of the PRO card to suit your needs, this tutorial describes in detail the various options.

### Configuring the receiver channels

The PRO version supports 5 or 6 channels from the receiver, this choice can be made by the dip-switch n° 6.

When set to OFF, the board will consider the 5th channel (usually a two-way switch on the transmitter used for retractable gears) as a switch for the playback of two separate sound effects (Slider1 and Slider2).

In the file ibu2.ini you can find these following three strings (in this case the third string is unused).

Slider1 = usspeak1.wav

Slider2 = usspeak2.wav

Slider3 = usspeak3.wav

You can change the sounds by renaming the audio files retrieved from the command string, just as for the management of motor sounds or effects.

### Make sure you always have the corresponding audio file in the root of the memory card

By setting the dip-switch No. 6 to ON, the card is ready for a 6-channel receiver, then the behavior of the 5th channel changes becoming the switch that turns on or off the engine of the vehicle.

Channel 6 (usually a potentiometer on the transmitter used for flaps) now becomes a three-position switch to play three different sound effects.

In the file ibu2.ini now you can use also the 3rd string:

Slider1 = usspeak1.wav

Slider2 = usspeak2.wav

Slider3 = usspeak3.wav

The position of the potentiometer will enable the sound effect playback on the following measures:

0 .. 25% = No sound or stop playing the current sound

From 25% .. 50% = Plays the sound paired with Slider1

From 50% to 75% .. = Plays the sound paired with Slider2

75% .. 100% = Plays the sound paired with Slider3

Whatever the playback sound can be stopped by bringing the potentiometer set to 0, so you can go from one sound to another.

In addition to the servo barrel recoil card PRO can control two servos used to raise and traverse the gun, this option is useful on tank hunters as Jagdpanther or any tank without the turret.

The card also has the ability to control not only an actuator but also a standard servo continuous rotation.

The next page describes in detail the various configuration options





### Configuring the traverse servo

SrvBrandInverseCmd = FALSE; Flag to reverse the rotation of the servo. TRUE or FALSE  
This value allows you to reverse the direction of rotation of the servo, which is useful when there are installation problems.

SrvBrandUpdate = 20; Timing Update position of a servant, in ms. Accepted values are 0 .. 100  
This value allows you to change the speed of rotation of the servo, increasing the value will slow down the movement.

SrvBrandType = 0; standard servo: 0 = normal, 1 = continuous rotation. A value of 0, 1  
Allows you to select the type of servo you are using.

#### Note:

In case you are using this output with a continuous rotation servo to rotate the turret you need to set the type 1, otherwise (if you selected the type 0) since the output maintains the current position, the servo will not stop when you release the stick.

### Configuring the elevation servo

SrvAlzoInverseCmd = FALSE; Flag to reverse the servo direction. TRUE or FALSE  
This value allows you to reverse the direction of rotation of the servo, which is useful when there are installation problems.

SrvAlzoUpdate = 20; Timing Update position of a servant, in ms. Accepted values are 0 .. 100  
This value allows you to change the speed of rotation of the servo, increasing the value will slow down the movement.

SrvAlzoType = 0; servo type Elevation: 0 = normal, 1 = continuous rotation. A value of 0, 1  
Allows you to select the type of servo you are using.

#### Note:

In case you are using this output with a continuous rotation servo to rotate the turret you need to set the type 1, otherwise (if you selected the type 0) since the output maintains the current position, the servo will not stop when you release the stick.

The continuous rotation servo is a device that holds the central position (neutral) until the stick is in the neutral position, moving the stick in one direction (or in the opposite direction), the actuator will rotate in the corresponding direction until the command is maintained. Bringing back the stick to center the actuator stops.

Typically servos are modified or devices such as the Hitec HSR - 1425CR.



## TROUBLESHOOTING

Nr.	ANOMALY	POSSIBLE SOLUTION
1	I turn on the tank but nothing happens.	<ul style="list-style-type: none"> <li>- The battery is exhausted: recharge</li> <li>- The power connections are broken or incorrect: check the connections from the battery</li> </ul>
2	With the stick in the bottom left of the engine does not start	- Check that the turret rotates in the right direction with respect to the control stick and the cannon shots pushing the left stick forward, otherwise it means that the diagonal to start the engine and check for other functions (smoke, lights, inertia) are in a different position. Try the other diagonal.
3	I turn on the wagon but the flasher (optional) continues to flash	-No valid RX signals received : check the connections between the IBU2 and receiver
4	The turret moves in opposite direction	- Reverse the channel turret rotation (Ch4) in the transmitter or in the settings file IBU2.ini
5	The turret rotates but not the tank	- Before you can move the tank you must send the command ignition engine: see chapter.
6	I have no sound	<ul style="list-style-type: none"> <li>- Ensure that the volume is turned up</li> <li>- Ensure that the speaker is connected</li> <li>- Ensure that the samples are all present in the microSD card, the correct size and properly associated to its function in the file IBU2.ini</li> </ul>
7	The chariot moves or steers the opposite direction compared to controls	- Reverse the acceleration channel (Ch1) and / or steering (Ch2) on the transmitter or in the settings file IBU2.ini
8	The servo recoil of the gun does not move	<ul style="list-style-type: none"> <li>- Check that the servo connector is inserted with the correct orientation</li> <li>- Check that the servo can move freely in the direction of recoil and eventually reverse its direction of motion in the settings file IBU2.ini</li> </ul>
9	The cannon fires (you can hear the sound) and recoils but I do not see the flash light	- Check the polarity of the connector of the LED firing
10	The card overheats or feel a burning smell	- Disconnect the battery immediately / off the wagon: there must be some short circuit in your links!



## Frequently Asked Questions

### Brake light problem:

Brake light brightens when engine is running. It dims when the engine stops/idles. Even when the Momentum is turned on, the same thing happens.

The solution:

IBU2.INI file - inside you will find **BrakeDuration= 5000** (default). There is no problem with this value. But if you look harder - there is a *space* after = followed by the value **5000**. It should have read as **BrakeDuration=5000**.

### Faster forward than reverse:

Forward movement is slow but reverse is faster, even with stick controls correct.

The solution:

The left and right motor wires are plugged in wrong way round AND the throttle channel is reversed. These two errors cancel each other out so the tank moves forward when stick pushed forward, but the IBU2 is thinking it is reversing and reducing the speed.

### Track recoil, tank goes forward:

When firing main gun the tank momentarily reverses to mimic the recoiling of the tank. But yours is going forward.

The solution:

The left and right motor wires are plugged in wrong way round AND the throttle channel is reversed. These two errors cancel each other out so the tank moves forward when stick pushed forward, but the IBU2 is thinking it is reversing and reducing the speed.

### Turn track recoil off:

Don't want the track recoil active?

The solution:

IBU2.INI file - inside you will find **TrackRecoilTime=10** (default). Change this to **TrackRecoilTime=0**

### Adjust super spin setting:

Don't want the super spin active?

The solution:

IBU2.INI file - inside you will find **PowerRotation=70** (default). Change this to **PowerRotation=0**  
To adjust how much super spin is active change the value with the range **0 – 100**, 0 been no super spin, 100 is maximum super spin.



### **Airsoft timings:**

Sometimes I have to fire 2 or 3 times before airsoft fires ball.

The solution:

IBU2.INI file - inside you will find **RecoilTimeDigital=500** (default). Change this to **RecoilTimeDigital=1500 or higher**. Some fine tuning maybe required to suit your airsoft unit, but 1500-1750 seems to work for most.

### **Servo recoil goes wrong way:**

You've installed your servo to the recoil but the action is the wrong way round

The solution:

IBU2.INI file - inside you will find **RecoilInverseCmd=TRUE** Change this to **RecoilInverseCmd=FALSE**. Or other way round.

### **The board has a flashing green light:**

#### **This is normal and proves the board is powered up okay:**

If you have NO flashing light check the battery is fully charged, power switch is on, polarity of the supply cable, boards small 2A fuse has not blown.

#### **I've blown the small 2A fuse:**

What is it and where do I buy from?

#### **The solution:**

The fuse is "LITTELFUSE 0453002.MR SURFACE MOUNT FUSE"

These can be purchased from Farnell or RS Components in the UK, or [www.newark.com](http://www.newark.com) in the US RC Tank Electronics also sell them for £1 each plus shipping.

### **Gun elevation:**

My gun goes up when I hold stick down or other way round

#### **The solution:**

This is because the Heng Long, Taigen, WSM, Torro elevation gearbox works on a continuous cycle. i.e. has no limit at max up or max down. To fix the operation push stick up and wait until the gun moves to max up position. Then use stick down for all down elevation and stick up for all up elevation.

### **My smoker won't work:**

#### **The solution:**

The smoker by default is in the off state when tank is powered up. This is to protect it if it has no smoke fluid in it. You need to switch on the smoker function as detailed in the manual. Also note the smoker will only work whilst the engine is running.



### **Engine won't start on my IBU2Pro:**

#### **The solution:**

With the IBU2Pro the engine start/stop is moved to the 5<sup>th</sup> radio channel when dip switch 6 is in the ON position. Using the left stick diagonally down is also deactivated in this state.

### **Engine keeps stopping:**

#### **The solution:**

The IBU2 is detecting the battery voltage is falling below a preset voltage and the IBU2 is turning the engine off to protect the battery from exhaustive discharge. Note also with cheaper batteries this can also happen when the drive motors demand a lot of energy like a sharp turn on a difficult surface.

### **Can I IR battle Heng Long/Taigen tanks**

#### **No:**

The IBU2 only transmits the Tamiya IR code which is ignored by these tanks and vice versa. The IBU2 will IR battle against tanks fitted with the following electronics (provided they have IR emitter and receiver install)

Tamiya

SLU

EIMod

Clark

DBC

### **My tank cuts out when firing the main gun:**

This is probably an issue with the track recoil and battery. The battery cannot sufficiently provide enough voltage whilst the tank is in motion and activate the track recoil.

#### **The solution:**

Use a different battery, typically LiPo are fine at resolving this problem.

Turn off the track recoil feature.

Only fire when stationary.



## Authorized Dealers

Europe	RC Tank DE	<a href="http://www.rctank.de/index.php">http://www.rctank.de/index.php</a>
U.K. USA Asia Oceania	RC Tank Electronics	<a href="http://rctankelectronics.weebly.com/">http://rctankelectronics.weebly.com/</a>
Italy	Modeltecnica	<a href="http://www.modeltecnica.it/catalog/index.php">http://www.modeltecnica.it/catalog/index.php</a>
Japan	AYARD Corporation	<a href="http://shop.ayard.jp/">http://shop.ayard.jp/</a>