This manual is written for the ACU for Flakpanzer Gepard. There are some modifications on usage of servo and LED ports. Please also notice that GSU (gun stabilize unit) is not supported.

MTC-2 highlight features:

- MTC-2 can work alone as a twin motor ESC, with 8A continuous current for 130 to 280 size motors.
- Continuous speed changes with forward, reverse, left, right and pivot turn.
- ECS brake function, motors can stop instantly.
- Simple one button setup procedure.
- Battery options: 1-2 Cell Lipo (3.7 – 7.4V), 4-6 Cell NiMH (4.8-7.2V)
- Auto shutdown at low battery.
- Dimension (PCB): 38 x 25 x 20mm (1.5” x 1” x 0.8”)

ACU for Flakpanzer Gepard highlight features:

- Three servo ports for turret rotation, gun elevation and search radar retraction.
- Machine gun led flashes for Oerlikon cannon.
- Search radar rotation motor.
- Search radar enabled by CH5, or stick motion.
- Oerlikon cannon can fire in ground attack mode or anti-aircraft mode.
- Simulation of aircraft attack, with aircraft attack sounds and auto cannon firing.
- 22KHz high quality digital sound effects, including Oerlikon cannon sounds in anti-aircraft mode and ground attack mode, aircraft attack sounds and engine sounds.
- Engine sound includes engine start, stop, idle, and running. Engine sound changes according to speed. Engine sound can be turned off by jumper.
- ACU size 38 x 25 x 12mm (1.5”x1”x0.5”)

Contents

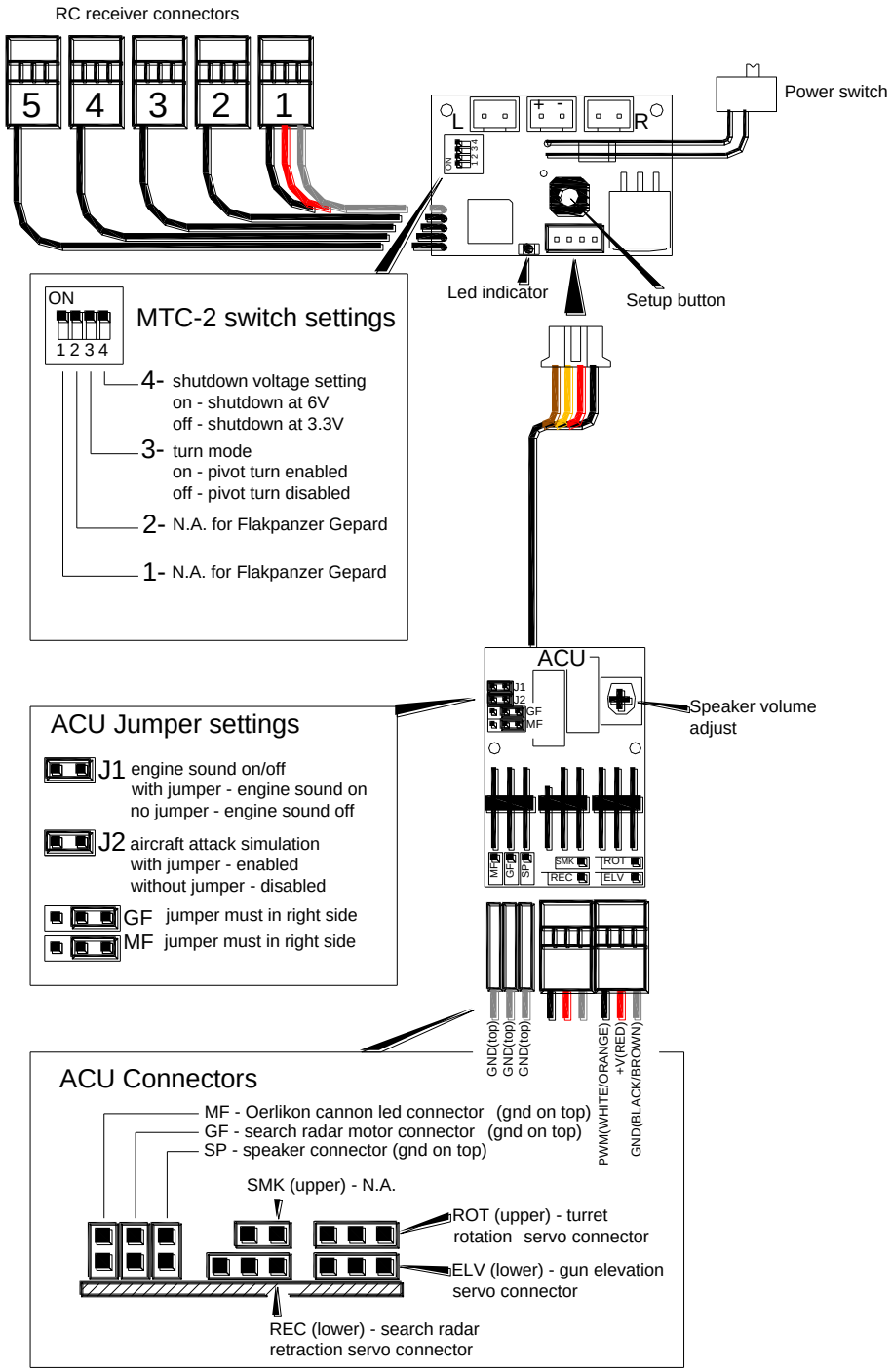


Fig.1 - MTC-2 and ACU (for Flakpanzer Gepard)

MTC-2 parts:

1) Battery connector – 4.8 – 7.4V battery input. **DO NOT REVERSE INPUT POLARITY TO AVOID DAMAGE!** Remove battery when not in use for long time.
2) RC receiver connectors – 4-5 CH receiver is required. For 5 CH receiver, CH5 is used for enable of search radar.
3) Led indicator – multi-purpose indicator. When power on, it lights up 1 sec and then blinks slowly if it do not receive RC signal. It lights up continuously when signal is received from the RC connectors. It will also flash during the setup process. See setup procedures for details.
4) Setup button – setup MTC-2 for a particular transmitter. It also setup the gun reload position if R jumper is on. See setup procedures for details.
5) Dip switch 1 – N.A. for Flakpanzer Gepard.
6) Dip switch 2 – N.A. for Flakpanzer Gepard.
7) Dip switch 3 – turn mode. Switched on to enable pivot turning of tracks.
8) Dip switch 4 – shutdown voltage setting. Switched on to set shutdown voltage at 6V. This is suitable for 2 Cell Li-po battery. Switched off to set shutdown voltage at 3.3V. This is suitable for 1 Cell Li-po, or NiMH battery. See the input voltage section for more details.

ACU parts:

9) ROT port – turret rotation servo port. A continuous rotation servo is connected here to control turret rotation.
10) ELV port – gun elevation servo port.
11) REC port – search radar retraction servo port.
12) Speaker volume adjust – trimmer to change speaker volume.
13) SP port – speaker port, for driving 8Ohm / 1W speaker.
14) GF port – search radar rotation motor.
15) MF port – Oerlikon cannon led port.
16) J1 jumper – remove jumper to turn off engine sounds.
17) J2 jumper – aircraft attack simulation jumper. When jumper is installed, aircraft attack simulation will starts when the search radar is enabled. Aircraft attack will start periodically. The firing of Oerlikon cannon is automatic. Please notice that you cannot trigger Oerlikon cannon during simulation.
18) GF and MG jumpers – both jumpers must install in the right side (see Fig.1).

Notes:

1) Lipo battary can be dangerous if not use properly:
   - always use a dedicated Lipo charger
   - do not short circuit to avoid explosion!!
   - follow all safety precautions of your Lipo and charger
2) DO NOT REVERSE BATTERY POLARITY TO AVOID DAMAGE!!
3) Disconnect battery when not in use for long time.
4) To avoid interference, solder 1uf capacitor between power leads, and 0.1uf capacitors between motor case and power leads.
5) CH5 is used to enable search radar.
6) Turret rotation servo must be modified to continuous rotation. See technical tips in the web page for details.

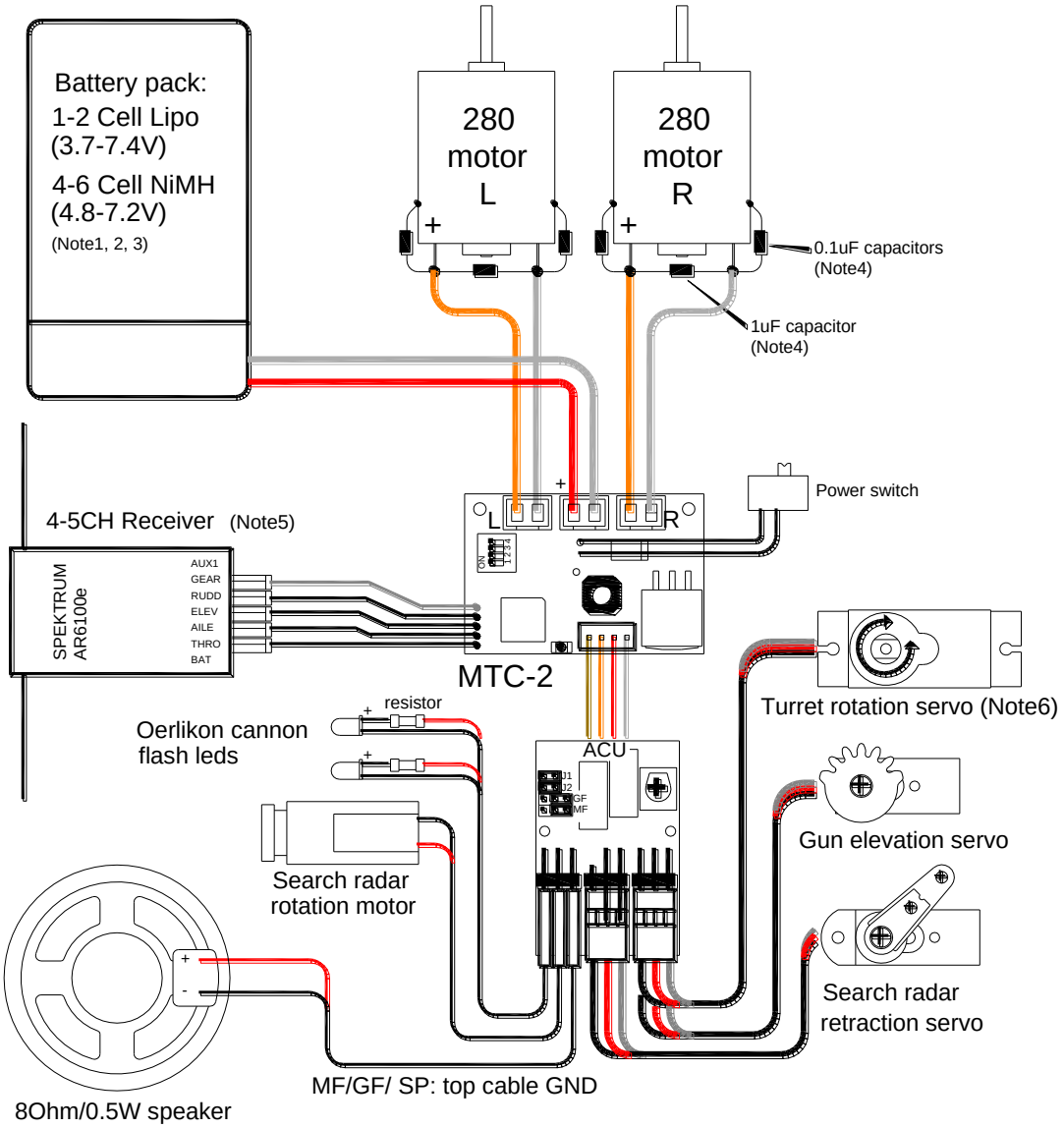


Fig.2 - MTC-2 and ACU connection for Flakpanzer Gepard

Transmitter Stick Modes

The stick mode of MTC-2 is shown in Fig.3. If your transmitter has a different stick mode, change the connector numbers accordingly.

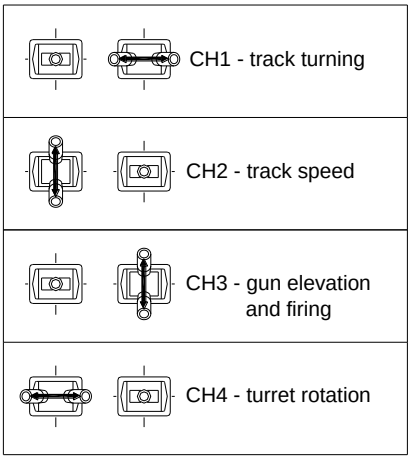
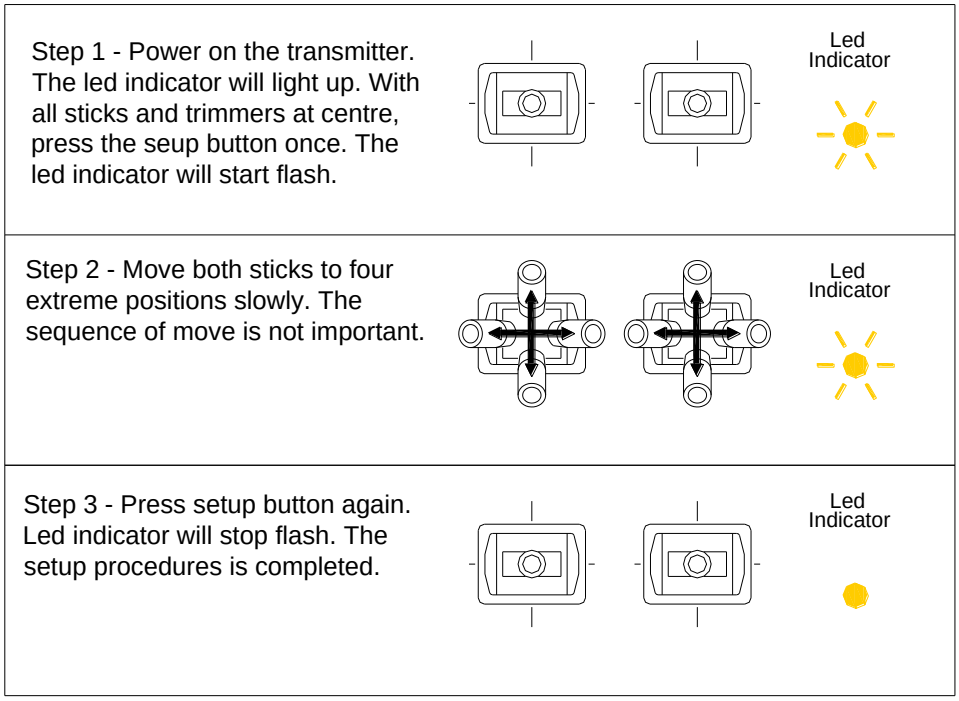


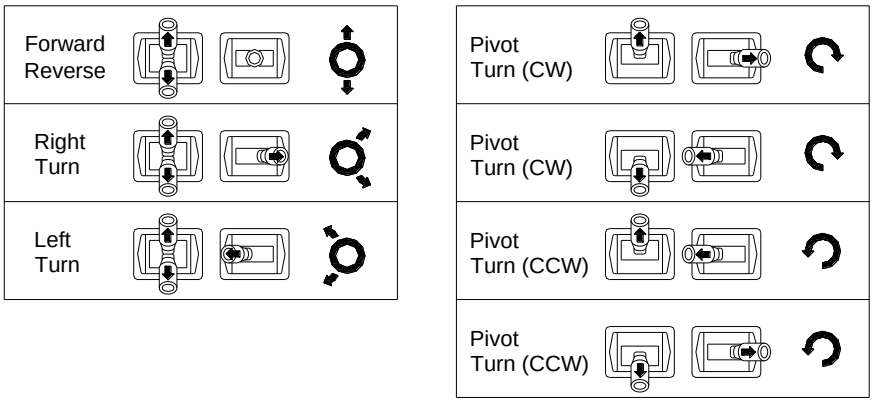
Fig.3 - Stick modes of MTC-2

Setup Procedures of MTC-2

When using MTC-2 for the first time, or when you change the transmitter, you must perform the setup procedures to store the transmitter characteristic in MTC-2. To avoid unintended track motion, disconnected motors or remove tracks during setup.

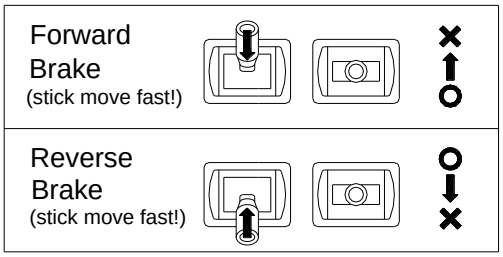


Track Motion Control



- Pivot turn begins when right stick move halfway left or right
- Pivot turn is disabled when dip switch 3 is switched off (Fig.1).

Brake Function

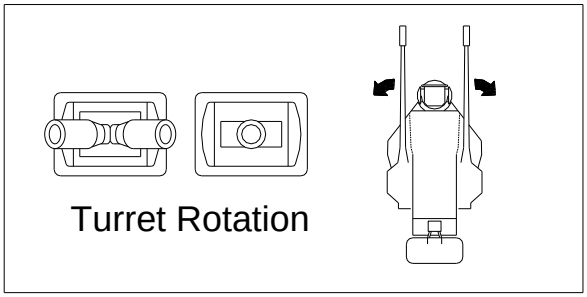


- Motors stops instantly when left stick moves fast backward.
- After brake, left stick must move back to center to restart track motion.
- Brake action however is not enabled at very low speed.

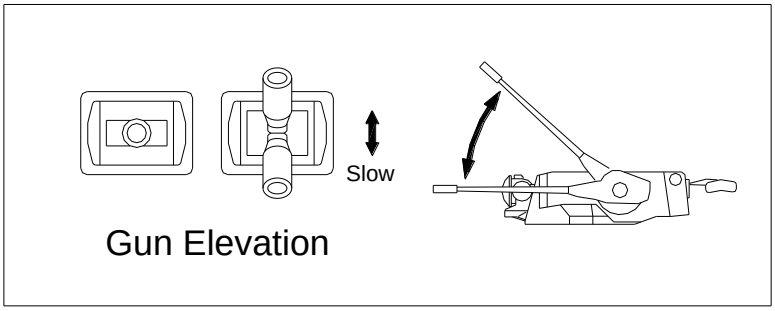
Reset to Factory Settings and Disabling the Brake Function

To reset the receiver ranges to factory default values, press and hold the setup button for 4-5 sec until it stop flash. MTC-2 is then reset. This will also toggle the brake function from enabled to disabled, or vise versa.

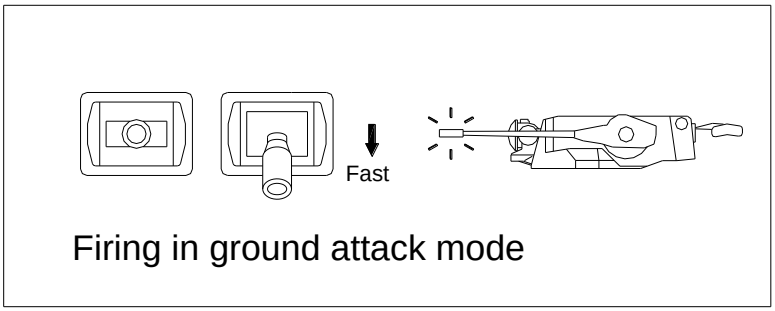
Turret Rotation



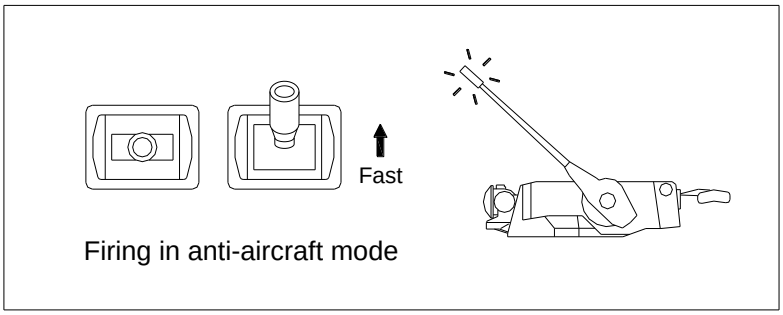
Gun Elevation



Firing Oerlikon Cannon



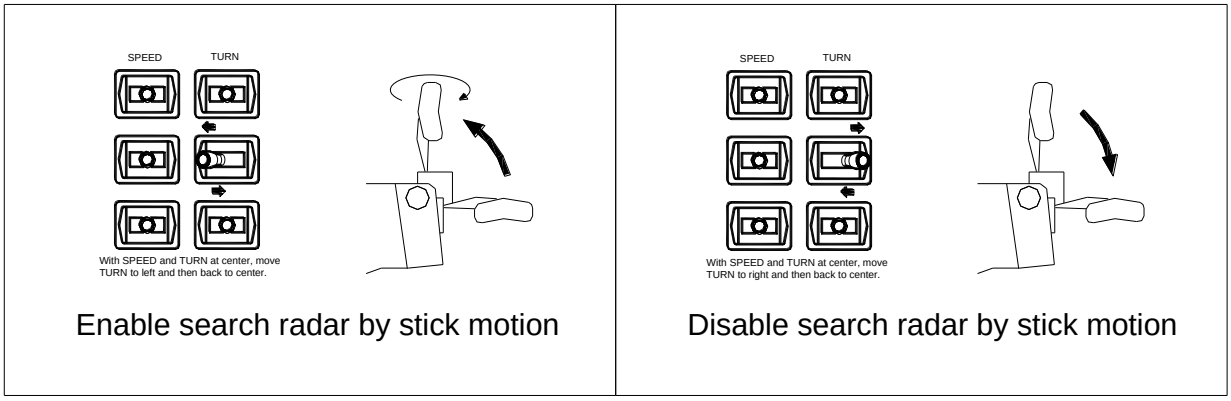
- To fire in ground attack mode, move right stick quickly from middle to bottom. Cannon will fire continuously at 2 rounds per second. The firing will stop when stick move back to middle.



- To fire in anti-aircraft mode, move right stick quickly from middle to top. Cannon will fire 10 rounds in 1 sec. After firing, move stick back to middle to resume operation.

Enable and Disable of Search Radar

When search radar is enabled, it will stand up and rotates. Search radar can be enabled or disabled by CH5. If CH5 is not available, it can be enabled or disabled by stick motion.



Enable search radar by stick motion

Disable search radar by stick motion

Simulation of Aircraft Attack

When search radar is enabled, and if J2 is also installed, simulation of aircraft attack will begin. Aircraft attack sound will play periodically, and Oerlikon cannon will fire automatically. Please notice that you cannot trigger cannon during simulation.

Engine Sound Control

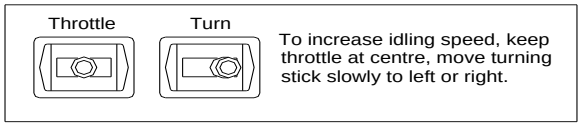
Engine sound will be generated when ACU is connected and J1 installed:

Engine start – trigger by first throttle.

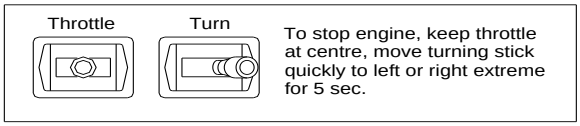
Engine idling – when tank not running, turning stick position controls engine speed. Move turning stick slowly to left or right will increase engine speed.

Running – when tank in running, engine speed changes according to speed.

Engine stop – with throttle at center, move turning stick quickly to left or right extreme position for 5 sec. Alternatively, engine will stops in 5 sec after transmitter is turned off.



Change idling speed by stick motion



Engine stop by stick motion

Input Voltage

- MTC-2 is designed to work at 4.8 - 7.4V (4 - 6 cell 1.2V NiMH, or 2 cell Lipo battery). To avoid over discharge of Lipo battery, it will shutdown automatically when input voltage is too low. After shutdown, the motors will stop and led indicator flashes slowly. Also, the ACU beeps if connected.
- Dip switch 4 determines the shutdown voltage. When switched on, the shutdown voltage is set at 6V. It is suitable for 2 cell Lipo. When switched off, the shutdown voltage is set at 3.3V. It is suitable for NiMH and 1C Lipo.
- When using 4 cell NiMH or 1C Lipo, operation becomes unstable when input voltage drops below 4V. This may happens before auto shutdown and you should replace the battery.
- When using Lipo battery, follow all safety precautions and always disconnect battery after use.

Troubleshooting

Symptom	**Cause**	**Resolution**
Led blinks when tank moves Tank out of control	Motor interference Low battery	- Add noise filtering capacitors (Fig.2) - Keep antenna away from motors cables - Prevent loose metal contacts - Motor fault, replace motor - Replace or recharge battery
Led indicator not stable, or turns off	Antenna problems	- Check antenna length - Keep antenna in vertical position - Keep antenna away from motors cables
Led indicator dims when tank moves	Low battery	- Replace or recharge battery
Cannot trigger main gun / machine gun	Improper setup	- Do setup again
	Wrong jumper setting	- Check GF, MF jumpers