

R.C. PRESS

1:10 EP 4WD RC Truck



Intro to EXTREME Configuration

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*This ebook serves as an introduction to our
Extreme Configuration Project.*

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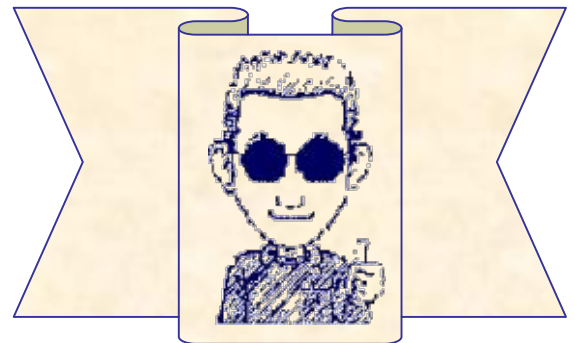
Preface

R.C.PRESS is the premier information source for R/C technologies. It has the goal of putting all different kinds of R/C technologies on the global map by publishing e-books that bring to light the knowledge of R/C technology innovators.

Members of the R.C.PRESS editorial team are practicing engineers, technicians and racers who have been with R/C Modeling & Racing since the early days of Tamiya Frog and Kyusho Optima. Being geographically close to the origin of R/C products enables close contact with the major manufacturers, thus facilitating in-depth and accurate coverage of the hottest "toys of the trade".

Because we are part of the industry, we know what information is really needed, and we make sure our e-books tell what people really need to know. We do not mind to criticize things that don't work, and we will not hesitate to give you hacks and workarounds to difficult problems. Reading this e-book should be like having a R/C professional by your side, passing on useful hints whenever you get stuck.

We need to thank our sponsors for their high quality speed boat kits and parts. Many thanks!



This book deals with basic knowledge that can be applied to most 1:10 electric RC trucks. Our focus will be on building an entry level extreme configuration.

We do assume that you have some experience with RC cars and the like so you know what the various technical terms mean.

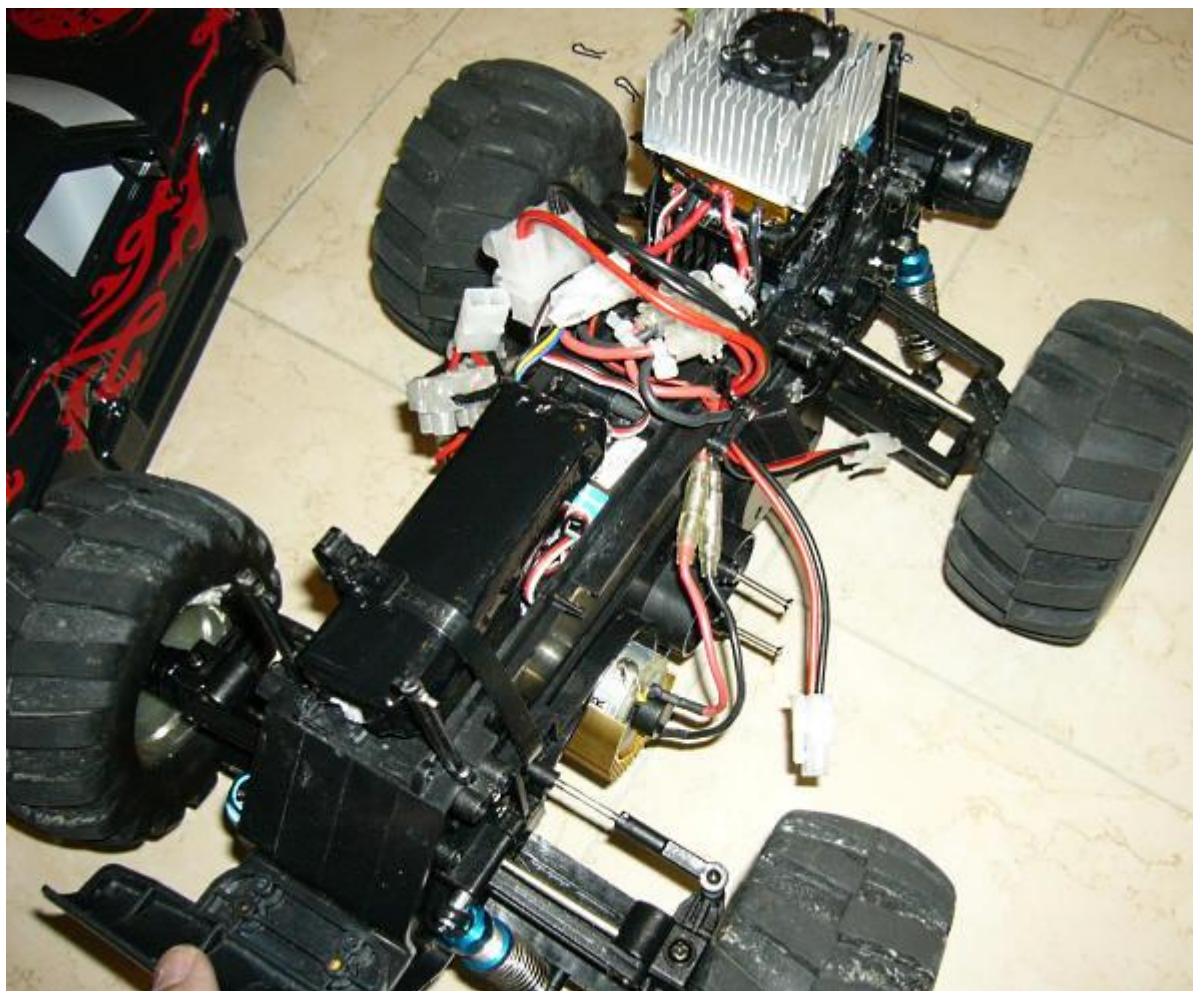
Entering into the world of extreme configuration

We use truck product from HobbyEngine for demonstration here.

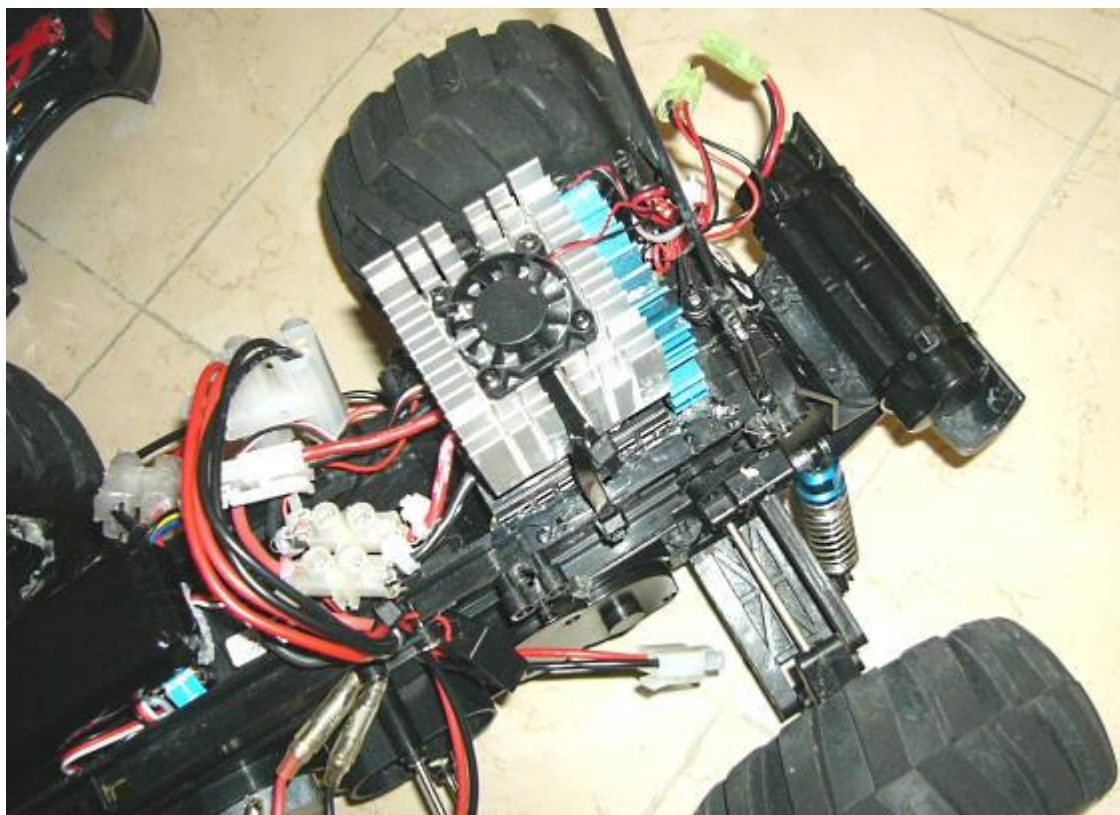


So what is considered as EXTREME? Take a look at the "entry level" extreme configuration below, a dual motor truck is equipped with a metal shell ESC (those you can find in RC speedboat) which is sandwiched by heavy duty heatsinks (those you find in your PC).



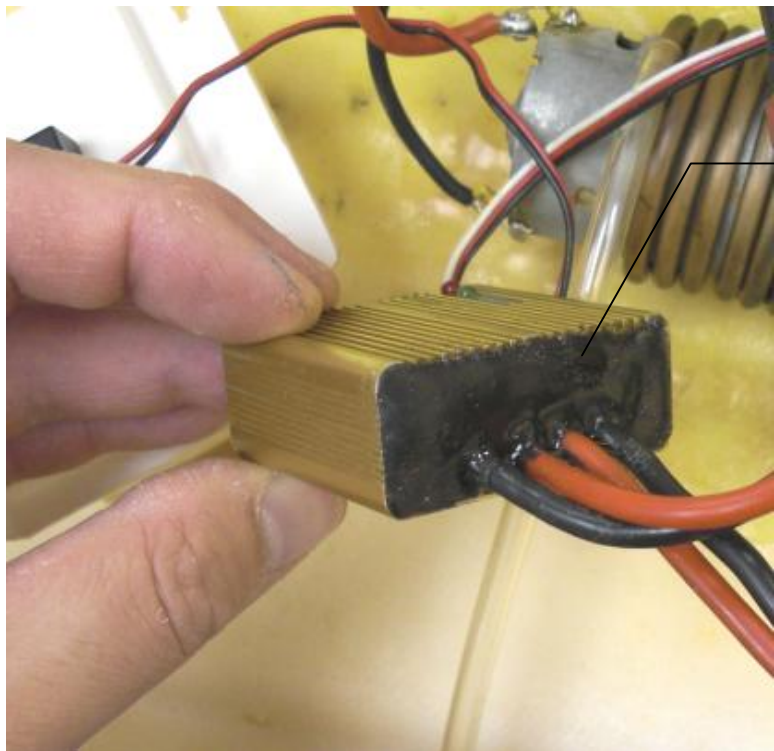


The truck body shell has a mega size opening so the upper heatsink can be exposed to the outside. Two 7.2V cooling fans powered by a separate battery pack are used for providing extra cooling. Optional motor cooling fans may be used as there is plenty of power from this separate battery pack.



Using a 11.1V Lipo on your vehicle can for sure deliver excellent horse power. HOWEVER, it can fail your ESC in minutes. If you are using high power battery like that you want to keep in mind the following points:

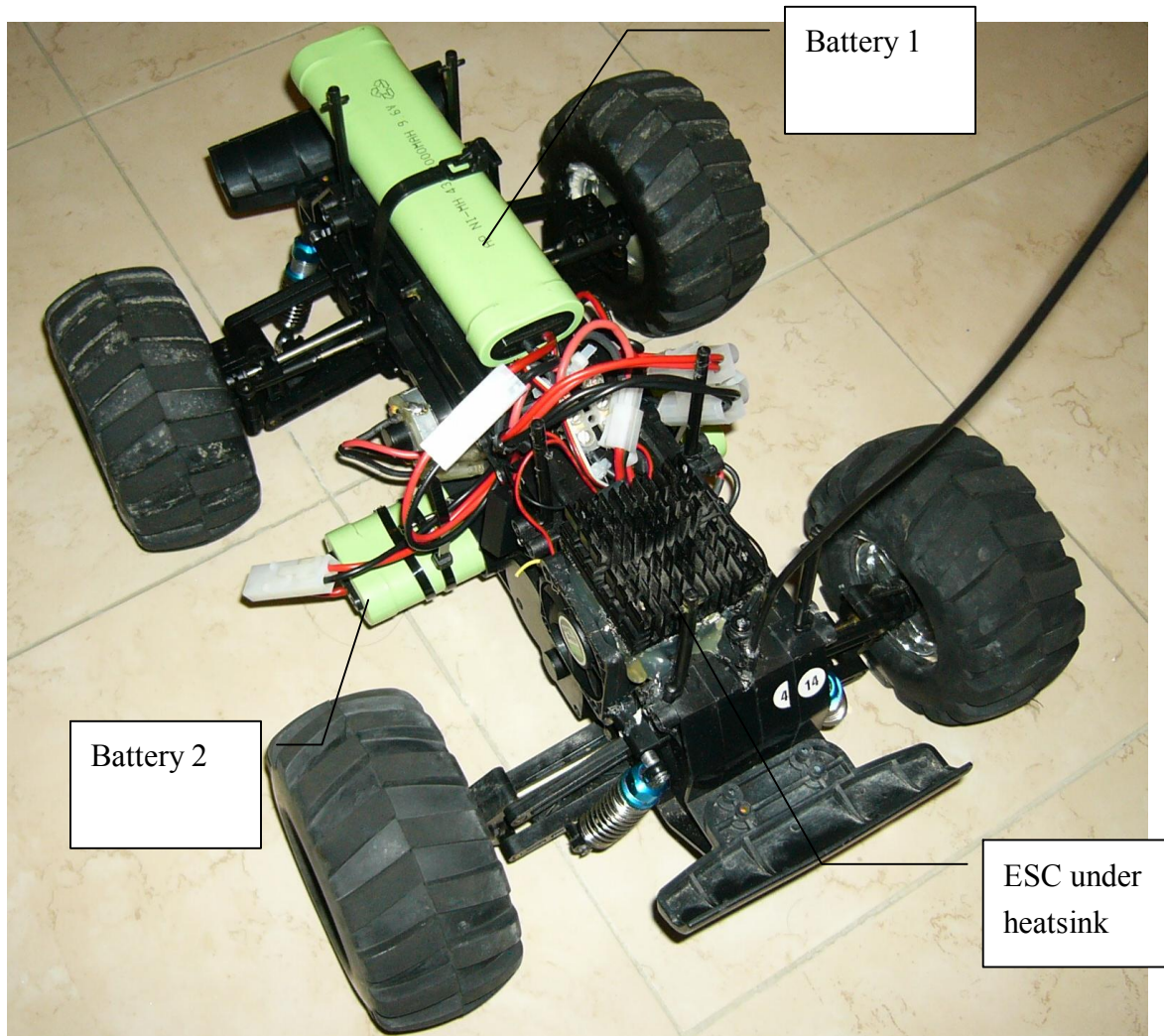
- A fan blowing at the solder posts of the ESC can help a lot. 5V or 12V DC fans used by computer coolers are fine (you don't need 12V to push a 12V DC fan... the fan will just spin slower with a lower input voltage). If you use a 5V fan you want to get power from the ESC-to-receiver connection (through the red and black wires) or from a separate source that does not go higher than 5V.
- A large heatsink always makes a huge difference in the amount of constant power the ESC can handle. If you are to custom make one, use aluminum as the material, which is cheap and easy to cut.



This ESC has a manufacturer specification of max 9.6V. Due to sufficient cooling, however, it can now take a 11.1V Lipo without any problem.

This is the ESC in use by the HobbyEngine Speedboat unit. It is forward only, but is fine for our purpose. The metallic shell is extremely efficient in heat dissipation.

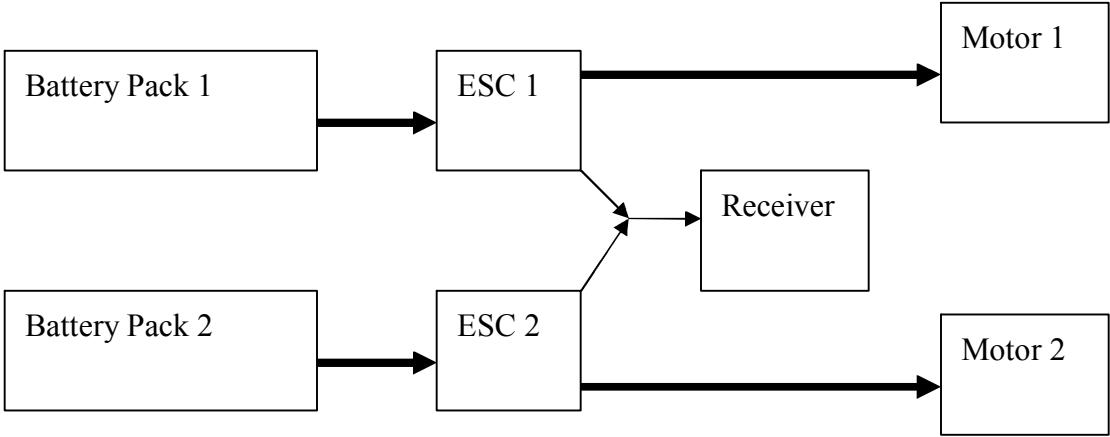
If you do not want to use Lipo, an alternative would be to use 9.6V NiMH. Using dual NiMH packs is a MUST when EXTREME configuration is in mind.



A typical dual-batteries configuration runs in parallel mode. In other words, it increases the total available mah (capacity) but not the voltage (power). So if you are expecting much higher performance speed and torque wise, this may not be an optimal solution. Remember, an extra battery pack adds weight to the truck!

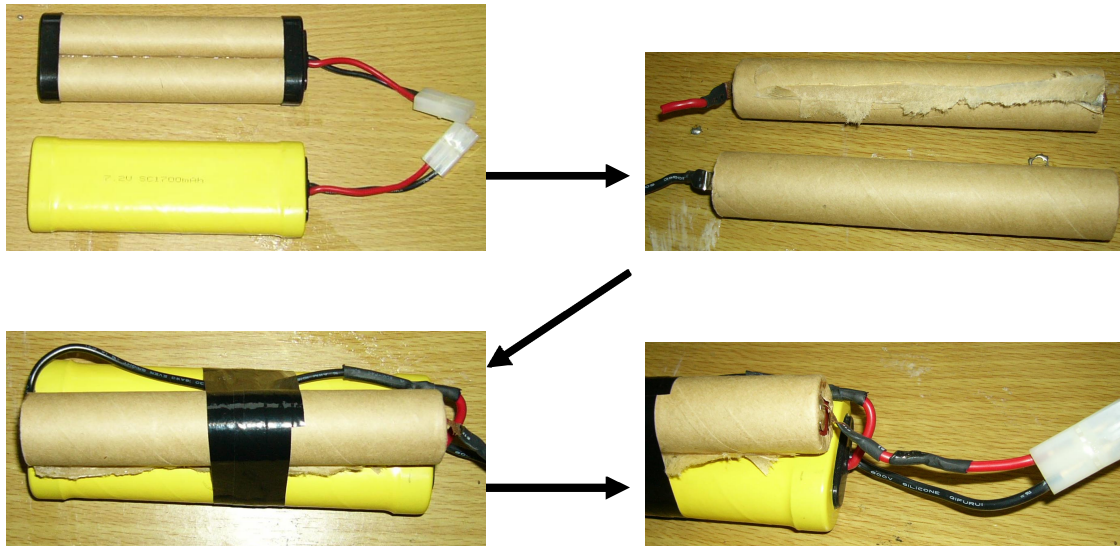
Eric from Telebee suggests that for twin motor truck you may actually use 2 ESCs to spread the load. Under such configuration, you use TWO

battery packs, one for each ESC. Then you have both ESC connected to the same receiver via Y connections (through manual wiring or through using a servo Y-harness) on all ALL wires. According to Eric. their V16R ESCs can support this kind of configuration:



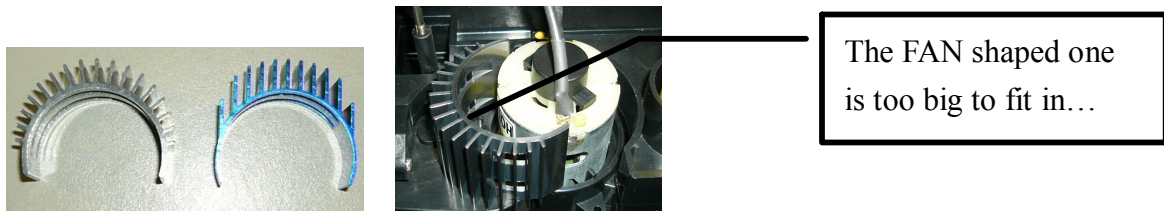
The problem is that, this is sort of a parallel configuration. You will see longer drive time and small increases in performance. You will NOT see dramatic performance improvement though.

As said previously a 11.1V Lipo is way too much for the ESC and the motor. Dual 9.6V would not be strong enough though. A logical solution is therefore to use something in between. In the examples below I tailor make a 10.8V cell using two packs of standard 7.2V:



While a 11.1V Lipo can kill a stock 540 motor in five runs or less, a 10.8V NIMH is much less damaging – we run it on a truck for 10 runs and the motor is still alive even though it is worn down quite significantly.

Always check the size and shape of the motor heatsink. Due to space limitation of the chassis some heatsinks may just be oversized. For example, 3Racing has 2 kinds of heatsink, one of a FAN shape (the left one) and another like a HIGH FINGER (the right one):



The HIGH FINGER one is smaller and can work with the Blackfoot Xtreme clone (as well as with most truggies and trucks). The FAN shaped one, however, is just too big. However, some cuttings may do the trick. In any case, **adding a motor heat sink (big or small) is ALWAYS a good idea.**

How the tires are configured would also affect the load of the motors. According to Sean Holman in his article "Choosing The Right Ratio - Uncovering The Secret Calculation",

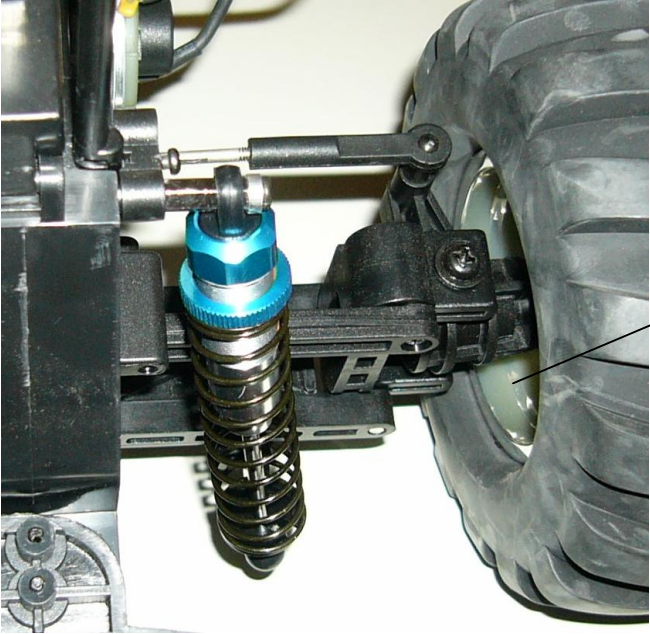
"With a bigger tire, the truck will feel like it is geared higher (numerically lower), which is great for highway cruising, but not for low-end grunt, off-the-line acceleration, or passing power. To bring your rig back to stock performance after a tire size upgrade, it is important to regear the truck accordingly."

With larger tires your motor has to work much harder. You need more torque from the motor in order to drive the bigger wheels more efficiently. Therefore, be very careful in selecting the proper tire size to use.

Another problem is on the size of the rim versus the size of the tire. We usually prefer a relatively larger rim size for more stable ride. If you have a large tire but a small rim, the empty space in between should be filled with foam or other material. A balloon-like tire which is totally empty inside may consume more power than necessary.



A relatively large rim



A relatively small rim

For the sake of convenience you may use Polyurethane Foam, which is capable of self-expanding for filling up all empty space between the inside of the tire and the rim. Just make a small opening and insert the tube, then press the nozzle for foam injection. This way of injecting foam does have a drawback – spread of foam may turn out to be quite uneven. Over filling can also deform the tire.

The above serves only as the **STARTING POINT** of a more advanced extreme configuration. To further improve its power and reliability, both motors should be upgraded, with each supported by a separate ESC and a set of high grade wires. Other cooling measures and structural reinforcement works on the various parts of the chassis (a lot of structural reinforcement works!) would need to be done as well.

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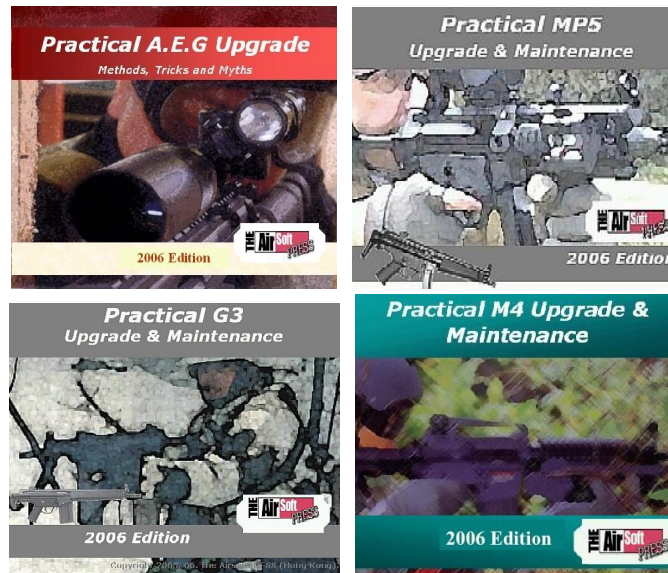
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