

The latest digital technology

TRIGGER MASTER

Full AEG Fire Control Computer

- 100% electronic control
- Semi-auto
- 3-Round burst
- Full auto
- Fully programmable
- Low battery warning
- Fits in almost any AEG
- Enhances motor operation

unconventional-airsoft.com



FULL DOCUMENTATION

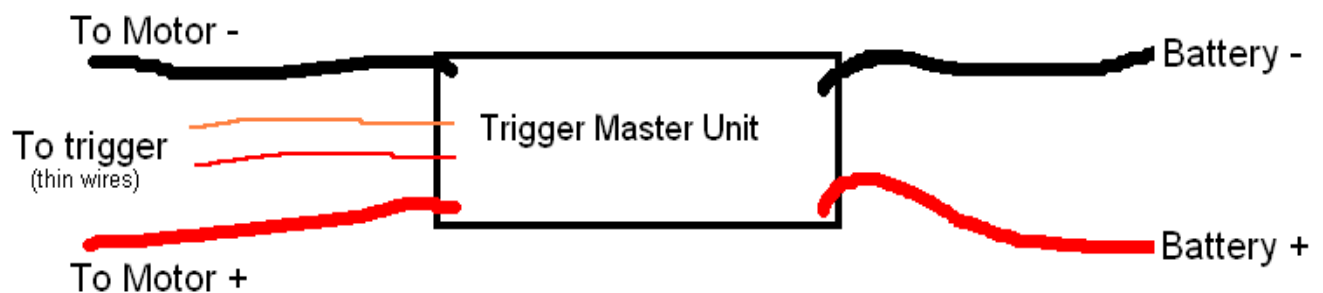
Congratulations on your new digital fire control computer! This unit will change the way you use and look at your electric gun. With this short document, you will know all you need to install and use your new **Trigger Master** unit!

HOW TO INSTALL

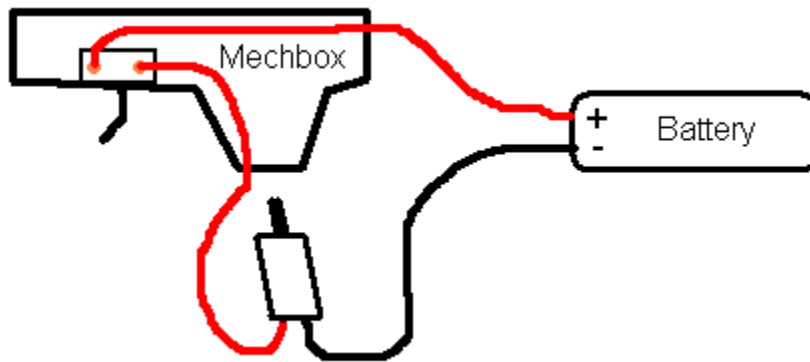
The Trigger Master is small enough to be placed in almost any spot inside an AEG. It can even sit in the same space as a normal fuse holder (replacing the stock fuse) if space is tight.

To install your **Trigger Master** unit, you will need to know how to take apart your AEG and how to modify some wiring.

The **Trigger Master** has wires coming out of it. One pair goes to the battery, one pair goes to the motor, and one pair is for the trigger contacts. These wires need to be attached to the battery, motor, and trigger contacts of your gun as shown below:

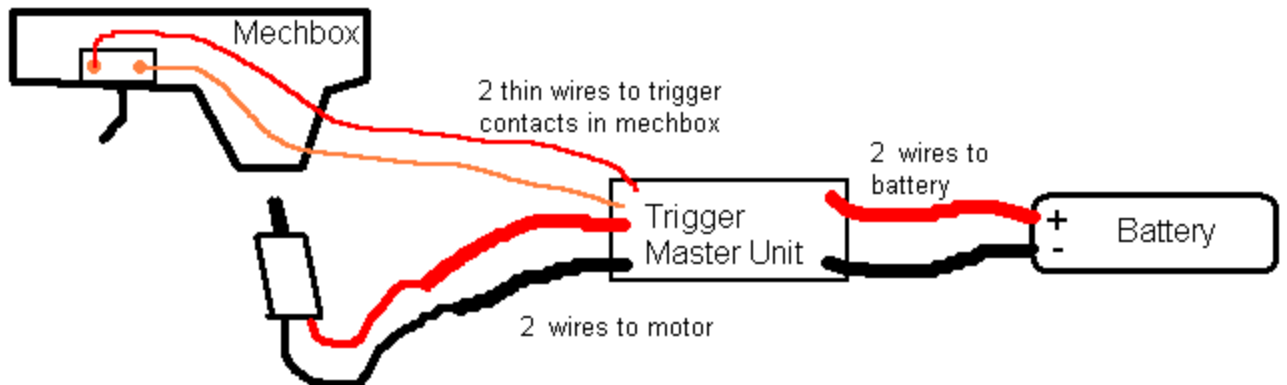


This is how a **normal AEG** is wired:



The trigger switch contacts are wired to connect power directly to the motor when pulled.

This is how the **Trigger Master** must be wired:



Wiring Notes:

The wires to and from the **Trigger Master** are already *twisted* in pairs. (Diagrams do not show the wires twisted to make it easier to see what wires go where.)

Try to leave as much of the *twist* in the wires as possible when you install, especially closest to the **Trigger Master** itself. The more twist is left in the wires, the better! (Twisting helps prevent electrical noise and voltage spikes due to the large currents used by the motor.)

All of the wires on the **Trigger Master** unit are more than long enough to accommodate any wiring layout you desire, and any custom battery wiring you may have.

*Heat-shrink tubing is included in the **Trigger Master** package for your use in making any wiring modifications to your AEG.*

The Trigger: Attach the trigger wires from the Trigger Master to the contacts for the trigger in the gearbox - it doesn't matter which wire goes to which side. Depending on

the gearbox version, you may be able to use some of the existing wiring in the gearbox.

The Motor: It is recommended that where practical, you re-use the wires that go to the motor from the mechbox. These wires are pre-fitted and have special connectors for the motor terminals already attached to them. You can splice into the "To Motor" wires from the Trigger Master Unit to do so. Use the included heat shrink tubing to insulate and protect the splice.

The Battery: The "To Battery" wires should be connected to a battery connector. Be sure to match the "+" and "-" wires appropriately. Battery packs used should be rated at least 8.4V and never more than 14.4V.

Low-quality or low-capacity packs can result in unstable power that impairs performance. *Mini sized 8.4V packs will work, but expect them to run down quickly - their low capacity causes unstable power that impairs performance.* The Trigger Master works best with high quality, higher capacity battery packs.

As for the fuse - whether to leave the AEG's fuse in place, or take it out to make room for the Trigger Master unit is up to you. If you need the space to make things fit you can safely remove it - the Trigger Master will automatically provide its own over-current protection by shutting down the motor if it detects a problem such as a short.

HOW TO USE

YOU MUST TRAIN YOUR GUN WHEN POWERING UP FOR THE FIRST TIME.

1. After connecting a battery, hold the grip of the gun (where the motor is) and in a few seconds you will feel a short vibration, then a longer one. This means that the computer's self-check is complete and you can go to step two.
2. Now train your gun by shooting 5 single shots, one after another, in semi-auto. The gun is now trained and timed properly for your battery, gears, and motor. (You should do this every time you power up your gun to keep the training "topped up".)
3. You can now fire in:

Semi-auto	(selector on "Semi")
3-Round Burst	(selector on "Auto")
Full Auto	(keep trigger down after a burst to begin firing in full-auto)
4. When the battery is low, you will feel the motor vibrate briefly through the grip after shooting. You should replace the battery as soon as possible when this happens. If the battery voltage drops too low, the gun will not fire.

CARE AND MAINTENANCE

- Disconnect the battery when the gun is in storage. (The **Trigger Master** operates while the battery is connected and will slowly drain the battery if left connected for a long period of time.)
- Leave your finger off the trigger while connecting the battery, or the **Trigger Master** will be confused and report an error. (To fix this, disconnect then reconnect the battery.)
- For best results, use the highest-quality battery packs you can. The **Trigger Master** is optimized to get the most out of high-quality battery packs.
- Try to use the same battery packs with the same gun. The **Trigger Master** uses a highly accurate method of timing for the 3-round bursts, but switching to a much higher or lower voltage/capacity battery can cause timing errors to occur. (To reset the Trigger Master and teach it a new battery pack, do a TOTAL RESET as described in the support section below.)
- 99% of problems can be traced to low batteries!** Having strange problems? Charge your batteries with a good quality charger and give it another go!

SUPPORT AND TECHNICAL INFO

Full feature list:

- Full computer controller MOSFET driving of AEG motor with active braking
- Overcurrent protection (can safely replace the AEG fuse)
- Thermal protection (temperature monitoring, notification of user of overtemperature condition)
- Over- and under-voltage protection and warning.
- 3-round burst which becomes full-auto if trigger is held down.
- Full PWM motor control to maintain a constant performance, and reduce motor and drive train stress.
- Firing modes, burst timing, and rate-of-fire are all programmable by the user.
- Low-battery warning.

Detailed Startup Codes:

When a battery is connected, the Trigger Master does a power-up self-check which lasts 3 seconds. Afterwards, the test results are communicated via pulses (motor vibration felt through the grip). Here is a full list of possible results:

- | | |
|---------------------|---|
| One pulse | All systems go (normal). |
| Two pulses | Battery voltage is less than 7.0V (battery is really dead!)
System shuts down. |
| Three pulses | Battery voltage is more than 17.0V (too much!) System shuts down. |

Four pulses Trigger is down during startup. Release trigger, disconnect and re-connect battery.

If the gun did not shut down as a result of an error, a long pulse will now signal the user that the gun is ready to fire.

Detailed Post-Firing Codes:

After firing any amount of BBs, if any of the following conditions were met the user will be signaled by vibrations from the motor which can be felt through the handgrip:

One pulse = Battery voltage is low. Change battery as soon as possible.
If battery voltage drops below 80% then gun will not fire.

Two pulses = Overcurrent condition detected! Peak current >250A.
Motor is stopped, and gun will not fire. (Motor will only "click" if trigger is pulled, due to the computer instantly it shutting down.)

Three pulses = Overheating condition detected (>75 degrees Celsius).
Either your gun is in a fire, or **you are rocking out a bit too hard**.
Lay off the trigger and check if something is wrong before you melt your gun!

Advanced Configuration:

The following options are available to be programmed into the Trigger Master via a system of trigger pulls and motor grip-pulses for feedback. For advanced users only. Anything you set here will be remembered even if you disconnect the battery.

To enter advanced option programming mode, pull the trigger ONCE after the first short pulse when the battery is first connected to the gun.

You will feel 1 pulse. This means you are in MODE selection.

Pulling the trigger one or more times within the next two seconds will set the gun's function:

1 trigger pull = Normal mode (SAFE - SEMI - AUTO)

2 trigger pulls = 3-round Burst mode (SAFE - SEMI - BURST/AUTO)

3 trigger pulls = Semi-only mode (SAFE - SEMI - SEMI)

If you do not wish to change this parameter, do nothing.

(Mode cannot be changed if you have a semi-only unit.)

You will now feel 2 pulses. You are in BURST TIME REDUCTION mode.

Pulling the trigger one or more times within the next two seconds will shorten the length of time of a burst. This is useful if the gun happens to be shooting more

than 3 shots for a burst, or if you want to get 2-shot bursts.

Each trigger pull = 4% *shorter* burst timing

If you do not wish to change this parameter, do nothing.

You will now feel 3 pulses. You are in BURST TIME INCREASE mode.

Pulling the trigger one or more times within the next two seconds will lengthen the length of time of a burst. This is useful if the gun happens to be shooting less than 3 shots for a burst, or you're trying to make a 2-shot burst.

Each trigger pull = 2% *longer* burst timing

If you do not wish to change this parameter, do nothing.

You will now feel 4 pulses. You are in MOTOR SPEED REDUCTION mode.

Pulling the trigger one or more times within the next two seconds will reduce the speed of the motor, effectively reducing the rate of fire.

Each trigger pull = 10% *slower* motor speed

If you do not wish to change this parameter, do nothing.

You will now feel 5 pulses. You are in MOTOR SPEED INCREASE mode.

Pulling the trigger one or more times within the next two seconds will increase the speed of the motor, effectively increasing the rate of fire.

Each trigger pull = 10% *faster* motor speed

If you do not wish to change this parameter, do nothing.

You will now feel 6 pulses. You are in TOTAL RESET mode.

If you do not wish to enforce a factory reset, do nothing.

Otherwise: pulling the trigger and *holding it down for at least 5 seconds* will completely reset the gun's programming and set it back to factory defaults.

You will feel a long vibration when this is complete. Disconnect, then reconnect the battery to complete the reset and start the **Trigger Master** fresh.

When powering up the gun for the first time after a reset, fire the gun 5 times in semi-auto mode to train it.

ABOUT THE TRIGGER-MASTER

The **Trigger Master** is based on the excellent SW-COMPUTER by Terry Fritz, and available from <http://extreme-fire.com>.

The Trigger Master is 100% hardware compatible with the SW-COMPUTER, but the Trigger Master is being made available with some programming and feature changes, and it is being built and serviced by different people. To make this difference clear, they are being produced and serviced in Canada by unconventional-airsoft.com under the name "Trigger Master". They remain 100% hardware compatible with the SW-COMPUTER: add-on boards, upgraded chip software, etc will work on either of our units.

The hardware and software used is **open source**. You can obtain copies of the hardware design and source code at <http://unconventional-airsoft.com>. You are absolutely free to make and modify your own as long as you keep the hardware and software design free.

For additional help and the latest documentation, you can always go to <http://unconventional-airsoft.com/store/> or email store@unconventional-airsoft.com. (August 2008)