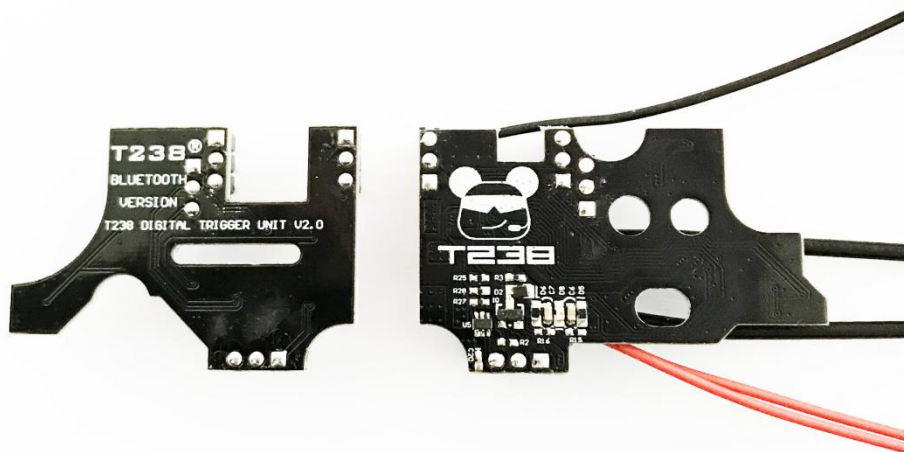


V2 T238 Digital Trigger Unit V2.0

Bluetooth Version

(With overheat protection & auto-loading)



Warning:

This upgrade kit is designed for professional AIRSOFT/gel ball blaster player who can fully disassemble and assemble Automatic Electric Gun. The compatibility with all Gearboxes is not guaranteed, but it can fit into standard or common brand Gearboxes V2 without larger modification. Related Tools and skills is needed for installing the product.

Attention:

1. Shim the gearbox before installation.
2. Protect the detection sensors while installing, keep the sensors clean, make sure that nothing is blocking the sensors.
3. Mind the positive and negative of the motor, do not reverse.
4. The DTU will not work correctly before the motor is installed with the gearbox.

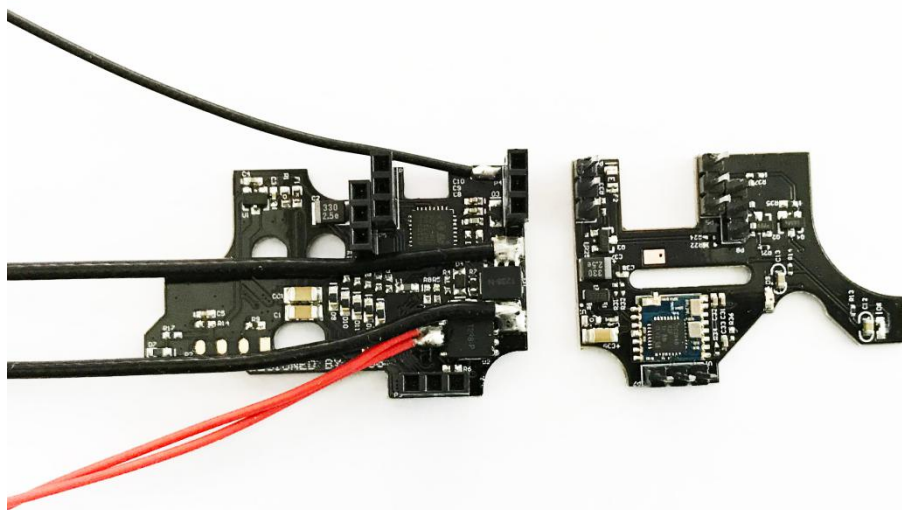
Description:

T238 digital trigger unit Bluetooth version is a programmable MOSFET which can be programmed by smart phone via Bluetooth, it is specially designed for AIRSOFT and gel ball version Gearbox V2. With high speed

processor, 8 optical sensors and 2 high power MOSFET chips, this system has many individualized programmable functions, such as piston positioning, binary trigger, multiple-shot and so on. Besides, it also has the functions of battery low-voltage protection and gearbox block-up protection. It can effectively improve the stability, shooting speed and response speed of gearbox, at the same time, it can completely eliminate the problem of gearbox single-shot become multiple-shot. The module uses a maximum of 12.6V batteries. Soldering and wiring are required.

Main parameters:

- Size: 45*30*14mm
- Operating voltage: 7.4-11.1V
- Integrated Bluetooth wireless communication module
- Programming via Bluetooth using smart phones
- Free APP for Android
- Active break tech & Piston reset
- Programmable auto-loading function
- Multiple programmable shooting mode
- Overheat protection
- Maximum Inrush current is 240A, Maximum Brake current is 100A
- Compatible with various Standard Gearbox V2
- Pre-Cocking control
- Rate of fire control
- Active braking effect control
- Sensors monitor
- DTU current, voltage and temperature report
- Total shot count and power-on time count



Functions:

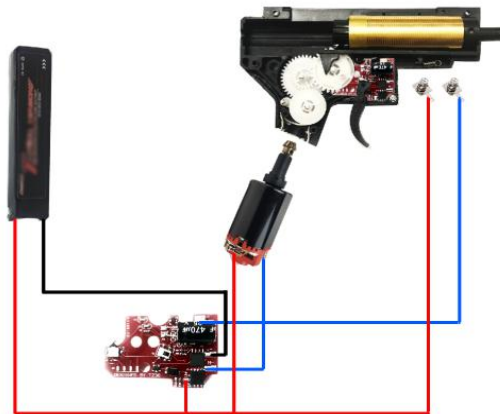
1. Low battery voltage protection, the default setting is protection OFF. Change the battery when hearing '4~3~2~1' 4 beeps low voltage warning sound.
2. Block-up protection. When gearbox Block-up occurs, the system stops working and emits an elongated '1~' beep. Please check the gearbox immediately by power off.
3. Auto-loading function is designed for gel ball blaster magazines with motor inside, when changing the magazine, the magazine motor will run automatically for a period of time, and the length of time can be programmed by 9th option.
4. This module is able to increase rate of fire, the stability of single-shot and make batteries have higher durability.
5. The energy that support the active brake function comes from the inertia of motor, stop the piston without delay. The effect of active brake is significant on high torque motor
6. The active function prevents the over-spin of gears, this solve the issue that the single shot becomes multiple shot under high voltage. Meanwhile, the spring is fully released in semi-auto mode and parts in gearbox are not under strain, increase the life cycle of gearbox and parts.
7. The system includes multiple shooting mode, these modes can be selected by fire select switch
8. The default position of the piston is adjustable in semi-auto mode. Pre-cocking function can be implementing, zero trigger delay
9. Adjustable rate of fire, the gap between two single shots can be programmable, to achieve adjustable rate of fire
10. When the DTU is overheated, after the trigger is pulled, the motor will give a beep prompt until it is automatically restarted after cooling.

Modes:

- SAFE:** This mode is completely the same as original safe mode. The trigger can be pull but nothing happens. This mode can be programmed to semi-auto, double stroke single shot, 3-round burst to 6-round burst, the default mode is safe mode
- SEMI:** This mode can be programmed to semi-auto, double stroke single shot, 3-round burst to 6-round burst, the default mode is semi auto
- AUTO:** This mode can be programmed to full-auto, 3-round burst, 6-round burst and 9-round burst, the default mode is Full-auto

Requirements:

1. Silver plate wire is needed for this system, power wire for motor and battery should be larger than 0.5sqm silver plate wire, wire for electronic powered magazine should be around 0.25sqm.
2. High-power soldering iron (higher than 50W) is recommended, solder the clip with 0.5sqm soldering wire and soldering rosin. Please ask professional for help if you do not know to solder.
3. Please use Spring smaller than M150.
4. Use high torque motor can stop the motor faster and prevent DTU from overheating .
5. In standby state, the current of the system is smaller than 0.01A. Please disconnect the battery if it is not used for a long time.



Installation:

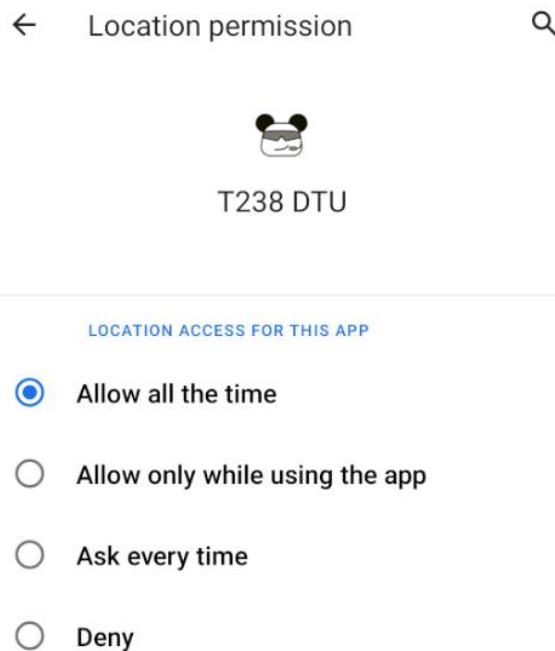
1. Shim the gears before installation to avoid damaging the gear sensor.
2. Disassemble the gearbox, it is necessary to take off the cut-off lever and the Safety lever, keep selector plate on the gearbox (Tutorial for disassemble gearbox can be found on YouTube).
3. Paste the attached insulation sticker on the corresponding position on the circuit board surface.
4. Install the module and push the wires in the gearbox (some gearbox needs to be cut off stiffener or drilled hole)
5. Assemble the gearbox.

APP for Android:



T238 DTU

Download and install the .APK file from the website: <http://github.com/t238>. After installation, enter the settings -> APP¬ification, find the “T238DTU”, go to APP permissions -> location permission, and select “Allow all the time”. This will allow the smart phone APP to find the Bluetooth devices.



Bluetooth:

Bluetooth programming function will be turned off in 30 seconds after power on. Connecting DTU with smart phone needs to be completed within 30 seconds after power on, otherwise, the DTU needs to be powered off and powered on again.

Trigger calibration:

There are five trigger sensors, which are convenient to adapt to different trigger rotation angles. When using DTU for the first time, trigger calibration is required. The specific operation is as follows: install the gearbox, grip and motor, connect the battery, when the prompt tone “1~2~3~3~2~1~” is heard, hold the trigger, and then release it. After repeating three times, the prompt

tone “1~2~3~” will be heard, indicating that the DTU has been calibrated. The trigger rotation angle of different gearboxes is different, so it needs to be recalibrated when replacing gearbox or trigger. To recalibrate the trigger, connect the app and restore the DTU to the factory settings. Restore factory settings is in the “Module parameter set”.

Sensors monitor:

Open the app, click “Search” button to find the Bluetooth device "T238DTU" and connect it.

The image shows two screenshots of a mobile application interface for a DTU (Direct Torque Control) system.

Left Screenshot: Service list

- About** (button)
- Service list** (header)
- Search** (button)
- DTU Basic Setting**
Basic parameter setting of DTU
- DTU Advanced Setting**
Advanced parameter setting of DTU
- Gearbox Stats**
Operation stats of gearbox
- DTU Sensors Monitor**
DTU sensors monitor
- DTU Operation Report**
DTU operation report
- Batter Charge Reports**
Battery report service
- Device information**
Device information service
- Module parameter set**

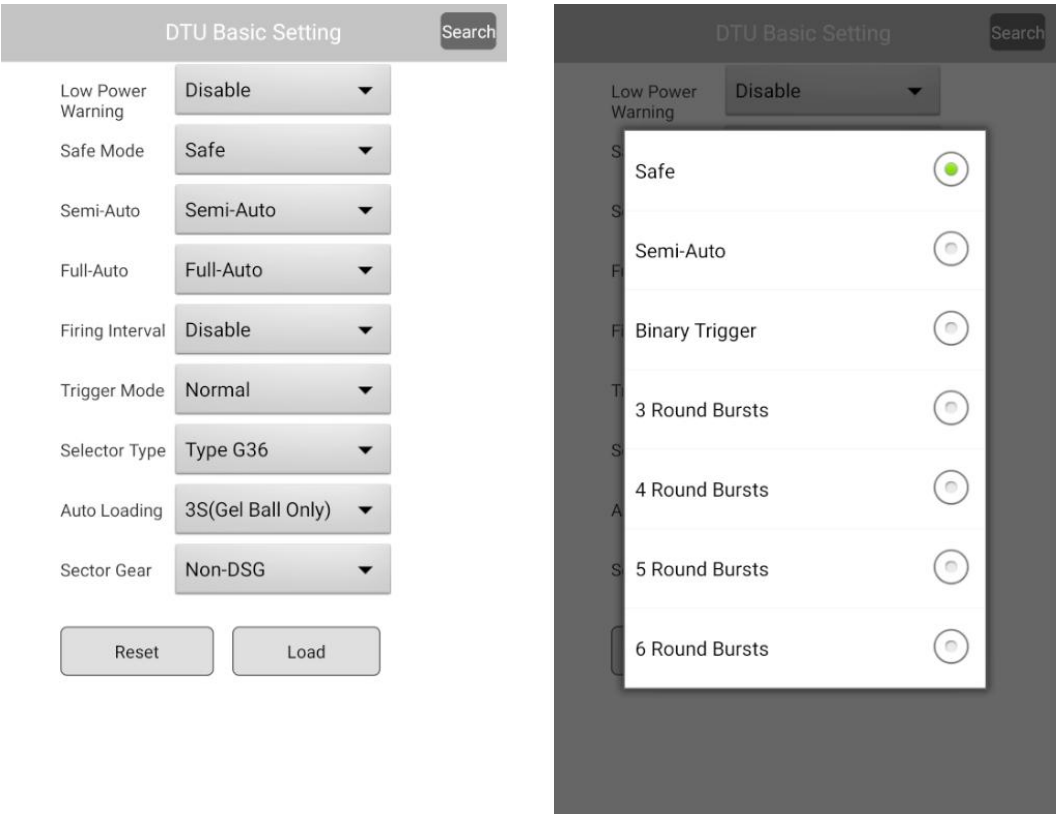
Right Screenshot: DTU Sensors Monitor

- DTU Sensors Monitor** (header)
- Search** (button)
- Optical Sensors Input**
 - When the monitoring mode is enabled, the motor will not work. When a sensor is triggered, the corresponding checkbox will be marked. Trigger0 corresponds to the maximum trigger angle, and trigger4 corresponds to the minimum trigger angle.
 - When the checkbox is marked, it means that the sensor at the corresponding position is triggered, otherwise, it means that the position sensor has not been triggered; to trigger a selector sensor, it is necessary to block two selector sensors with white reflective objects in turn, and to trigger the gear and trigger sensors, the corresponding position sensors need to be blocked by opaque objects in turn.
 - 00 00 00 00 ☐ Enable monitoring
 - Full-auto : ☐ Semi-auto : ☐
 - Gear : ☐ Trigger4 : ☐
 - Trigger3 : ☐ Trigger2 : ☐
 - Trigger1 : ☐ Trigger0 : ☐
- Electrical Sensors Data**
 - To test the following three sensors, it is necessary to observe whether the data changes after different working hours. If the data changes, it indicates that the sensors are

Go to “DTU Sensors Monitor”, and enable the “Enable monitoring” checkbox, move the trigger, selector plate and the sector gear to see if the corresponding checkbox changes. If no, means that the corresponding position sensor is faulty or the installation is faulty, and the corresponding sensor cannot be triggered. It is suggested to open the gearbox for investigation.

Programming:

1. Basic setting



Reset: reset the basic settings to the default settings.

Load: load basic settings from DTU.

Option\Parameter	1	2	3	4	5	6	7
1 Low power warning	Disable	7.4V	11.1V	9.6V			
2 Safe mode	Safe	Semi-auto	Binary trigger	3 round bursts	4 round bursts	5 round bursts	6 round bursts
3 SEMI mode	Semi	Binary trigger	3 round bursts	4 round bursts	5 round bursts	6 round bursts	
4 Auto mode	Auto	Semi	3 round bursts	4 round bursts	5 round bursts	6 round bursts	
5 Firing interval	Disable	0.5s	1s	1.5s	2s	2.5s	3s
6 Trigger mode	Normal	Sensitive	AUG Fire Mode: Light press semi-auto and heavy press full-auto				
7 Selector type	G36	AK47					
8 Auto-loading time (Gel ball only)	3S	2.5S	2S	1.5S	1S	0.5S	Disable
9 Sector Gear	Non DSG	DSG					

2. Advanced setting

DTU Advanced Setting

Search

Trigger Mode

Full low pulse

Full high pulse

Current pulse

Pre-cocking control(0~255)

0

Rate of fire control(0~255ms)

0

Active braking control(0~100%)

100%

Electronic fuse(15~100A)

100

Signal frequency setting(500~65535)

500

Magazine capacity limit(0~255 BB(s))

Disable

Open

Close

Reset

Load

Reset: reset the advanced settings to the default settings.

Load: load advanced settings from DTU.

Option	0	1~255
1 Pre-cocking control	Disable	Add some delay time before braking in order to control the stop position of the piston. The parameters need to be adjusted according to the actual situation, 0 ~ 255 can be adjusted.
2 Rate of fire control	Disable	The delay time between two single shots can be programmable, to achieve adjustable rate of fire. 0~255ms can be adjusted.
3 Active braking control	Disable	Adjust this parameter in order to control the brake strength. Properly reducing the brake strength can alleviate the motor heating and reduce the motor carbon brush wear
4 Electronic fuse		The adjustable range is 15 ~ 100A. When the working current exceeds the set value, the DTU will interrupt the work and give a warning beep.
5 Magazine Capacity Limit	Disable	The maximum capacity of the magazine can be set. When the firing shots are equal to the maximum load of the magazine, the DTU will wait for 2 seconds to simulate the operation of changing the magazine.

3. Gearbox stats

Gearbox Stats

Search

Shot Counter

No Data

Power-up Time

No Data

Average Rate of Fire

No Data

Refresh

Shot Counter: count the number of shots of gearbox.

Power-up Time: count the power on time of gearbox.

Average Rate of Fire: calculate the average rate of fire in fully automatic firing state.

4. Sensor Monitor

DTU Sensors Monitor

Search

Optical Sensors Input

When the monitoring mode is enabled, the motor will not work. When a sensor is triggered, the corresponding checkbox will be marked. Trigger0 corresponds to the maximum trigger angle, and trigger4 corresponds to the minimum trigger angle.

When the checkbox is marked, it means that the sensor at the corresponding position is triggered, otherwise, it means that the position sensor has not been triggered; to trigger a selector sensor, it is necessary to block two selector sensors with white reflective objects in turn, and to trigger the gear and trigger sensors, the corresponding position sensors need to be blocked by opaque objects in turn.

00 00 00 00 ☐ Enable monitoring

Full-auto : ☐

Semi-auto : ☐

Gear : ☐

Trigger4 : ☐

Trigger3 : ☐

Trigger2 : ☐

Trigger1 : ☐

Trigger0 : ☐

Electrical Sensors Data

To test the following three sensors, it is necessary to observe whether the data changes after different working hours. If the data changes, it indicates that the sensors are

DTU Sensors Monitor

Search

normal. It is suggested that the DTU should be operated for a period of time, and the sensor data and initial data should be compared after the voltage, current and temperature change.

Voltage Sensor :
00 00 00 00

Current Sensor :
00 00 00 00

Temperature Sensor :
00 00 00 00

Extended Port Input

The magazine port is the connection port of the gel ball blaster magazine port. When the magazine is connected to the blaster, the checkbox is marked, only work for the gel ball blaster.

00 00 00 00

Extended7 : ☐

Extended6 : ☐

Extended5 : ☐

Extended4 : ☐

Extended3 : ☐

Extended2 : ☐

Extended1 : ☐

Magazine : ☐

Optical Sensors Input: trigger sensors0~4, gear sensor, semi-auto sensor, full-auto sensor.

Electrical Sensors: voltage sensor, current sensor, temperature sensor.

Magazine port: this port is designed to detect the connection of gel ball magazine.

Extended ports: not yet developed.

5. Operation Report

DTU Operation Report

Search

Input Voltage :
No Data

Max Input Voltage :
No Data

Min Input Voltage :
No Data

Motor Start Current :
No Data

Average Semi-auto Current :
No Data

Average Full-auto Current :
No Data

MOSFET Temperature :
No Data

Max MOSFET Temperature :
No Data

Min MOSFET Temperature :

DTU Operation Report

Search

Min Input Voltage :
No Data

Motor Start Current :
No Data

Average Semi-auto Current :
No Data

Average Full-auto Current :
No Data

MOSFET Temperature :
No Data

Max MOSFET Temperature :
No Data

Min MOSFET Temperature :
No Data

Refresh

Refresh: refresh the report data.

Input Voltage: current input voltage.

Max Input Voltage: historical maximum input voltage.

Min Input Voltage: historical minimum input voltage.

Motor Start Current: average starting peak current of motor during the last operation.

Average Semi-auto Current: average motor current during the last Semi-auto operation.

Average Full-auto Current: average motor current during the last Full-auto operation.

MOSFET Temperature: current temperature of MOSFET.

Max MOSFET Temperature: historical maximum temperature of MOSFET.

Min MOSFET Temperature: historical minimum temperature of MOSFET.

6. Battery Charge Report

Batter Charge Reports

Search

Type:

No Data

Voltage:

No Data

Power:

0%

Acquisition power

Type: the supported battery types are Li-Fe and Li-Po.

Voltage: the supported voltage range is 2.5~12.6V.

Power: percentage of remaining electricity

Acquisition power: refresh the displayed data

7. Device Information

Device Information

Search

Device ID

Device software version

Info refresh

8. Module Parameter Set

Module Parameter Set

Search

Device name:

Refresh

Set name:

16byte

Set up

Pwd status:

init pwd 000000

Old pwd:

New pwd:

Modify

Cancel

9. GPS Locate

GPS Locate

Search

Start Location

10. Command Terminal

Command Terminal

Search

Length:0PKS:0

Length:5Send:0

Hello

ASCII

HEX

Send Interval

0.1s

Auto Send

Receive data

Reset

Clear

Send