

Electrical properties

Skycat.pro recovery systems

This document is created with best information available to us. However, there are so many drone manufacturers, creators, DIY's, electrical device suppliers and hackers etc. that we can't be 100% sure that anything described here applies to your drone.

Always inspect and test carefully the full system throughout before flight and make sure it works and is compatible!

If you are not sure or need more assistance, please do not hesitate to ask!

What if something goes wrong?

Sometimes mistakes happen and customers blow up things by wrong connections or anything experimental with electrics — that is just the normal learning curve.

If that happens, let us know what you did, in detail, and how you were able to blow it up. We will send you the new one. Really, our warranty applies to customer mistakes too.

We know, when you create new things, sparks or smoke can be part of the process. Don't use the device if it gets broken, but do let us know! We will replace it.

(This warranty applies to a limited amount per customer, so please do learn from those mistakes...)

Launch command: a PWM signal

Compatible with most RC radios and receivers

A typical recovery system consists of:

- A launcher, with a parachute inside
- Trigger: an electronic device for releasing the parachute
- A power source
- Source(s) for the eject command: PWM control
 - RC radio receiver
 - Autopilot
 - Automatic eject device
 - Arduino based special device
 - Or any device compatible with standard RC PWM control

Compatibility

The recovery system is originally designed to be compatible typical RC radios and receivers (these are the source(s) for eject command), which can control a normal servo.

Skycat.pro direct parachute launchers do not contain servos, but the principle of controlling the recovery system is exactly the same: If the eject command source(s) can control a normal servo, that can control a Skycat.pro recovery system.

Special control methods are available upon request.

Trigger V2

The Trigger V2 is standard Trigger supplied with all Skycat.pro direct launcher system. It can be upgraded to V3 pro or V4 pro Triggers, which are described in following pages.

The Trigger V2 requires an external 5V supply from the eject command source.

Two or more Triggers can be used side by side for multiple eject command sources. In that case the electrical connections and voltage lines must be carefully inspected to avoid short circuits and multiple power sources and voltages.

The V2 replaced the V1 in 2015. The main difference is the shape of circuit board, which is more optimized on Trigger V2.

TRIGGER V2



Technical data:

- Voltage 45 max.
- Signal standard RC PWM 50Hz
- 1ms Low is IDLE
- 2ms High is EJECT
- RED = +5V
- BLACK = GROUND
- WHITE = SIGNAL

LEDs:

- Short blink, long pause**
 - Standby, waiting for launch signal.
- Nearly continuously lit**
 - Launch activated
- Long blink, long pause**
 - No signal from receiver
- Double blink**
 - Launch signal detected at power up*

*If launch is activated when battery is connected, parachute will not be ejected.
For the Rescue radio: Trigger will not accept eject command until channel is toggled OFF and ON, i.e. Rescue Radio is switched OFF and ON.

Trigger V3 Pro

The Trigger V3 Pro could be purchased separately (upgrade) to replace the Trigger V2.

The main difference over the V2 is that Trigger V3 has an integrated 5V supply from the parachute battery.

This 5V supply can be used to power up the receiver, but it can't be used for controlling any high current devices, such as servos.

The integrated regulator is rated to 1 A and our recommendation is to not exceed 0.5 A for proper headroom.

TRIGGER V3 PRO



Technical data:

- Voltage 4S max. X85-CF
- Voltage 6S max. X48-CF, X55-CF and X68-CF
- Signal standard RC PWM 50Hz
- 1ms Low is IDLE
- 2ms High is EJECT
- +5V supply for RC receiver 0.5A max
- RED = +5V
- BLACK = GROUND
- WHITE = SIGNAL

LEDs:

Short blink, long pause

- Standby, waiting for launch signal.

Nearly continuously lit

- Launch activated

Long blink, long pause

- No signal from receiver

Double blink

- Launch signal detected at power up*

*If launch is activated when battery is connected, parachute will not be ejected.

For the Rescue radio: Trigger will not accept eject command until channel is toggled OFF and ON, i.e. Rescue Radio is switched OFF and ON.

Trigger V4 Pro

The Trigger V4 Pro can be purchased separately (or as an upgrade) to replace Trigger V2.

The Trigger V4 Pro is the latest in Skycat.pro series, released in limited amounts in 2018 and publicly available in 2020.

The software and hardware of this Trigger is fully redesigned to provide a more secure radio glitch protection and accidental eject protection. It also features two independent eject signal source channels.

NOTE: an update in next page.

Special firmware can be made upon request.

TRIGGER V4 PRO



Technical data for both channels:

- Voltage 45 max. X85-CF
- Voltage 65 max. X48-CF, X55-CF and X68-CF
- Signal standard RC PWM 50Hz
- 1ms Low is IDLE
- 2ms High is EJECT
- Requires 3pcs continuous High pulses in a row before Eject is triggered
- +5V supply for RC receiver 0.5A max
- RED = +5v
- BLACK = GROUND
- WHITE = SIGNAL

CH1 specific:

- Protected for accidental eject at startup. Three Low pulses are required before High pulses are accepted
- Use for the Rescue radio etc. which may be left to eject position during startup

CH2 specific:

- No accidental eject protection
- Accepts eject as soon as three continuous High pulses in a row are present.

LEDs:

- Short red blink, long pause
- Input 1: no any signal is present
- Input 2: no any signal is present

Nearly continuous green lit (standby mode)

- Input 1 trigger is active and waiting for eject command
- Input 2 trigger is active and waiting for eject command*

Short green/red blink

- Input 1 and 2: input signal is close to the eject threshold

Red blink 1:1

- Input 1: Eject is activated
- Input 2: Eject is activated

Nearly continuous red lit

- Input 1: Launch signal detected at power up**
- Input 2: no.

* For Input 2 this represents only the state of the input signal. This is not required for eject. If the launch is activated when the battery is connected, the parachute will be ejected.

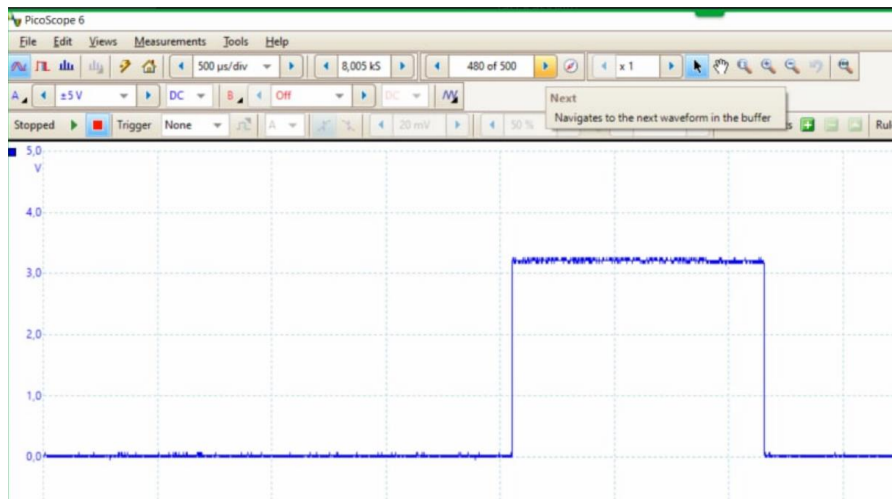
**If the launch is activated when the battery is connected, the parachute will not be ejected. For the Rescue radio: The trigger will not accept eject command until the channel is toggled OFF and ON, i.e. Rescue Radio is switched OFF and ON.

Trigger V4 Pro update

Some autopilots have a low current supply capability for PWM pins which may cause low PWM signal amplitude. It is seen that amplitude can be lower than V4 Trigger accepts.

V4 Pro Trigger input load is 4.7kOhm and recommended minimum PWM amplitude with that load is 3.3V.

Absolute tested minimum where Trigger didn't work anymore was 2.5V amplitude, without any margin.



TRIGGER V4 PRO



Technical data for both channels:

- Voltage 45 max. X85-CF
- Voltage 65 max. X48-CF, X55-CF and X68-CF
- Signal standard RC PWM 50Hz
- 1ms Low is IDLE
- 2ms High is EJECT
- Requires 3pcs continuous High pulses in a row before Eject is triggered
- +5V supply for RC receiver 0.5A max
- RED = +5v
- BLACK = GROUND
- WHITE = SIGNAL

CH1 specific:

- Protected for accidental eject at startup. Three Low pulses are required before High pulses are accepted
- Use for the Rescue radio etc. which may be left to eject position during startup

CH2 specific:

- No accidental eject protection
- Accepts eject as soon as three continuous High pulses in a row are present.

LEDs:

Short red blink, long pause

- Input 1: no any signal is present
- Input 2: no any signal is present

Nearly continuous green lit (standby mode)

- Input 1 trigger is active and waiting for eject command
- Input 2 trigger is active and waiting for eject command*

Short green/red blink

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Red blink 1:1

- Input 1: Eject is activated
- Input 2: Eject is activated

Nearly continuous red lit

- Input 1: Launch signal detected at power up**
- Input 2: no.

* For Input 2 this represents only the state of the input signal. This is not required for eject. If the launch is activated when the battery is connected, the parachute will be ejected.

**If the launch is activated when the battery is connected, the parachute will not be ejected. For the Rescue radio: The trigger will not accept eject command until the channel is toggled OFF and ON, i.e. Rescue Radio is switched OFF and ON.

The following pages are a sample of Skycat.pro
eject current/time graphs, based on tests with
various batteries and in different conditions.

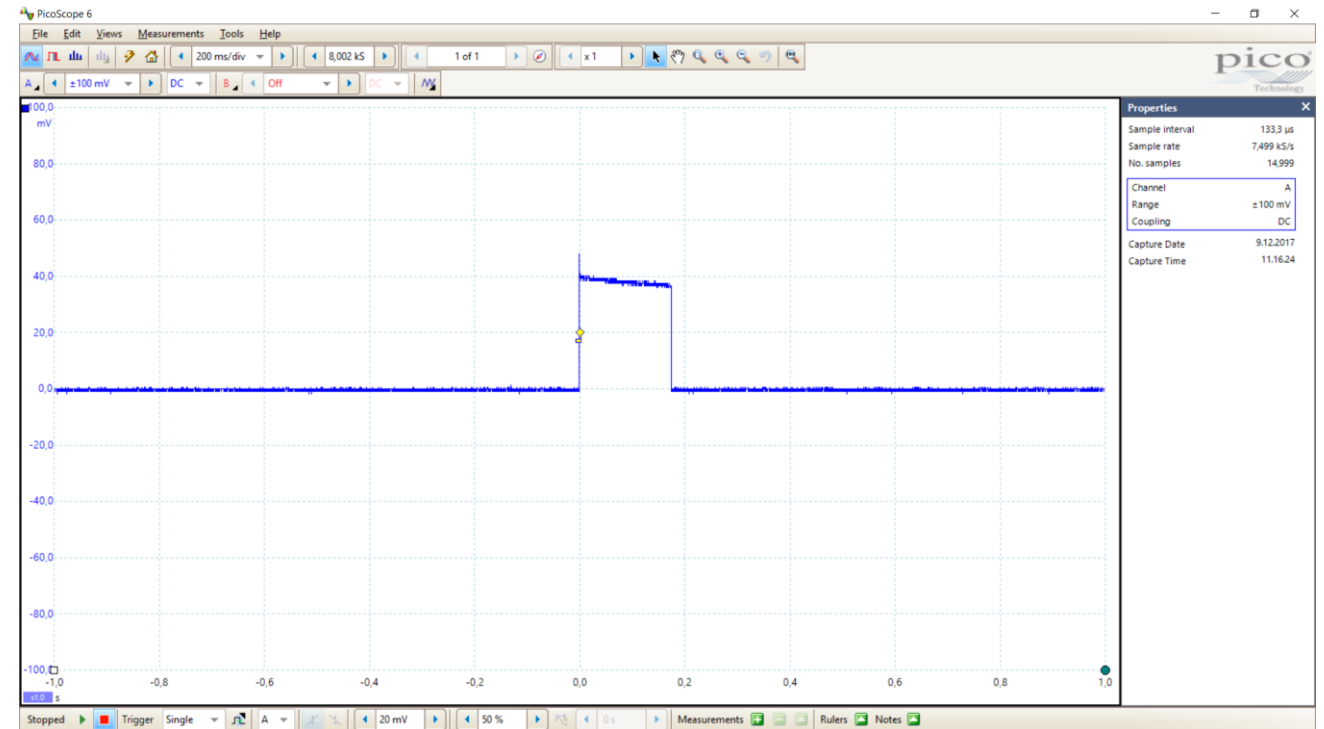
In general, X48-CF, X55-CF and X68-CF are close to each other.
X85-CF uses a different Fuse with different electrical properties.

X48-CF, X55-CF, X68-CF

Battery: 3S 800 mAh at full charge, room temperature

Y-axis: amperes

X-axis: seconds



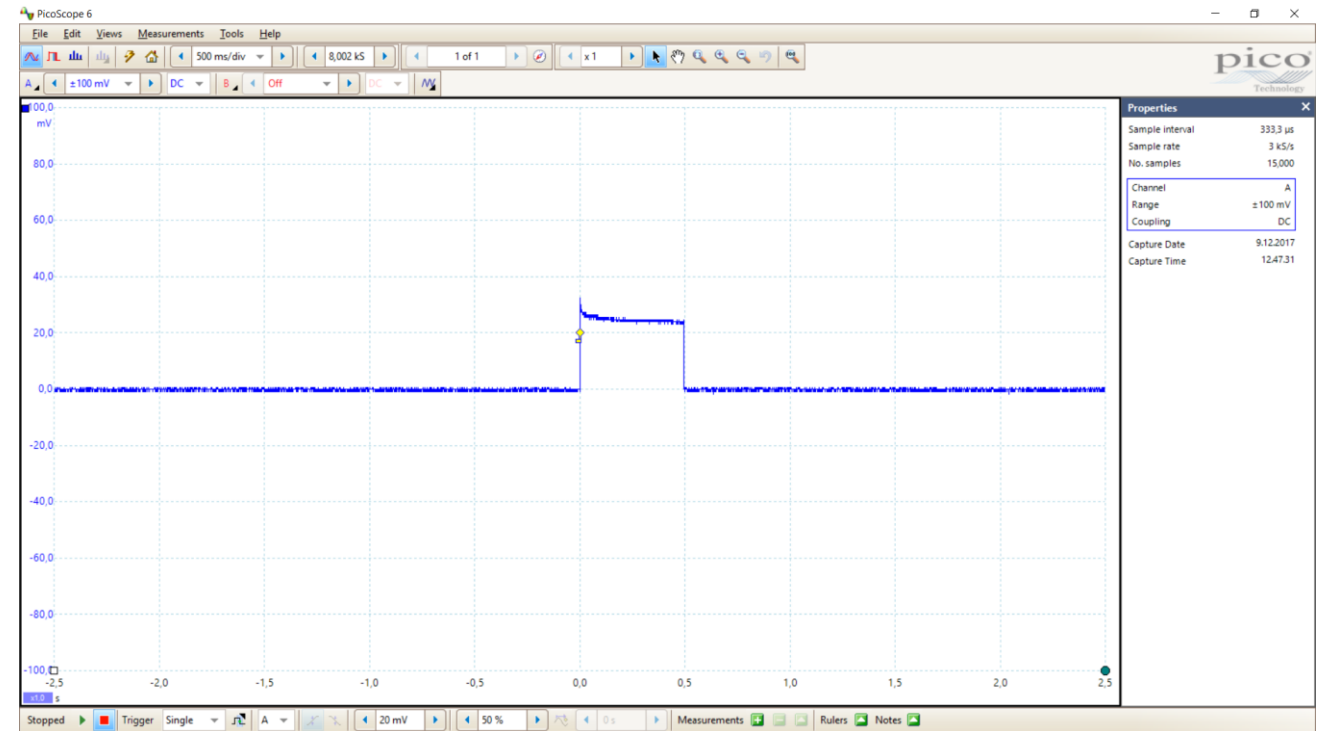
X48-CF, X55-CF, X68-CF

Battery: 3S 800 mAh, after 30 mins in a freezing temperature (-19 °C / -2 °F)

Voltage: 11.9 V (storage charge)

Y-axis: amperes

X-axis: seconds



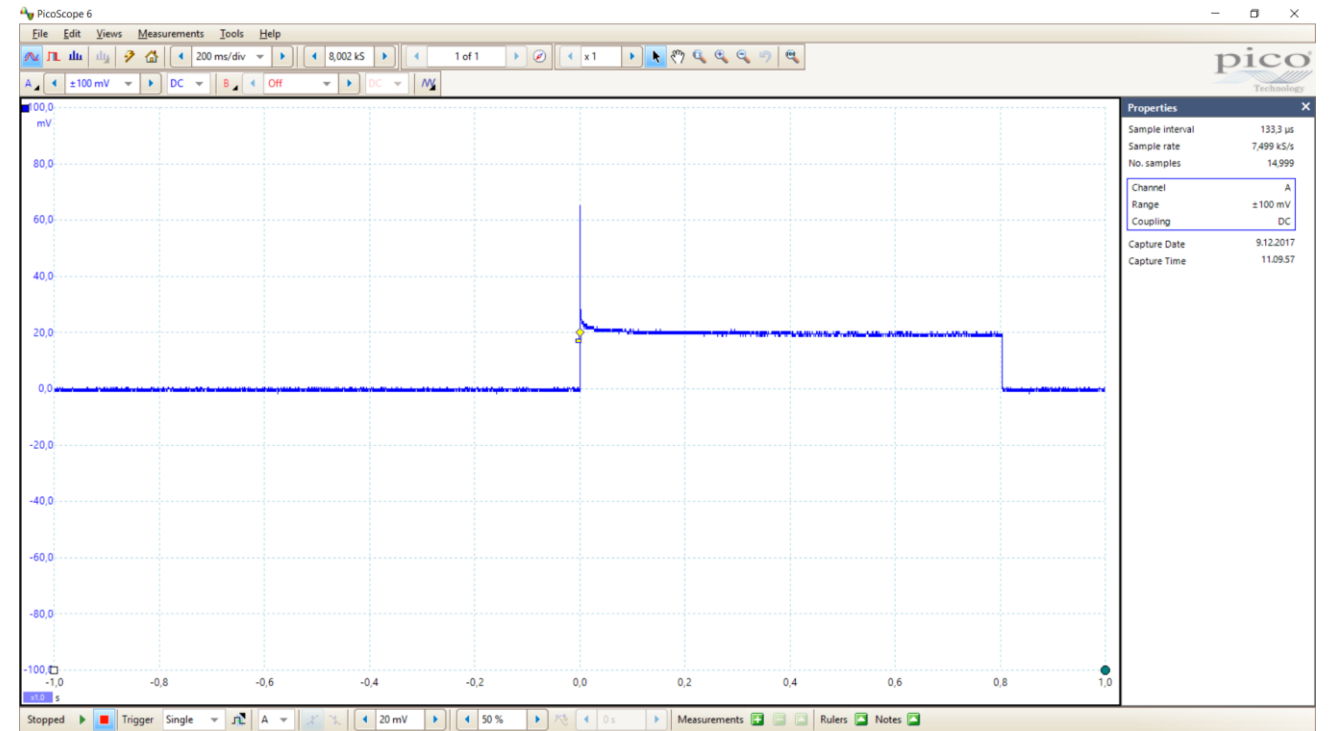
X48-CF, X55-CF, X68-CF

Battery: 3S 800 mAh, after 6 months in a freezing temperature (-19 °C / -2 °F)

Voltage: 11.9 V (storage charge)

Y-axis: amperes

X-axis: seconds



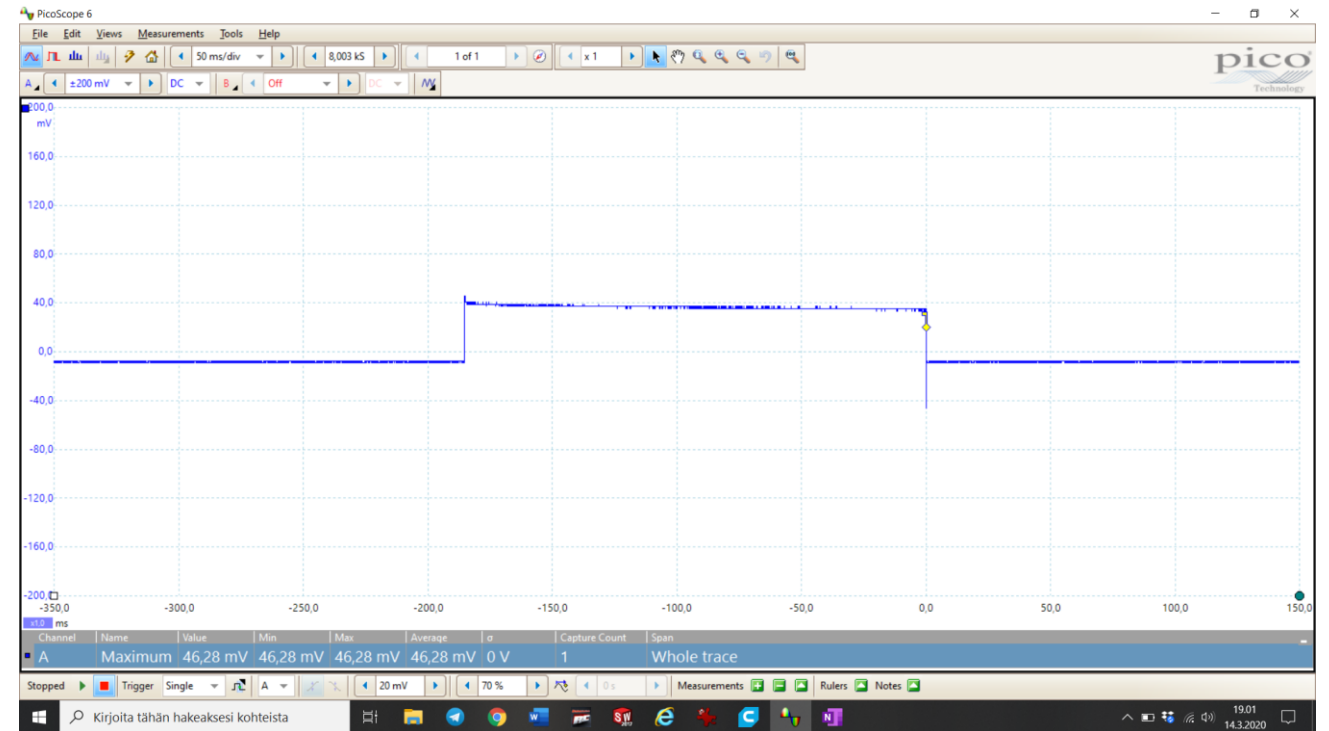
X85-CF

Battery: 3S 800 mAh

Voltage: 12.50 V (full charge)

Y-axis: amperes

X-axis: milliseconds



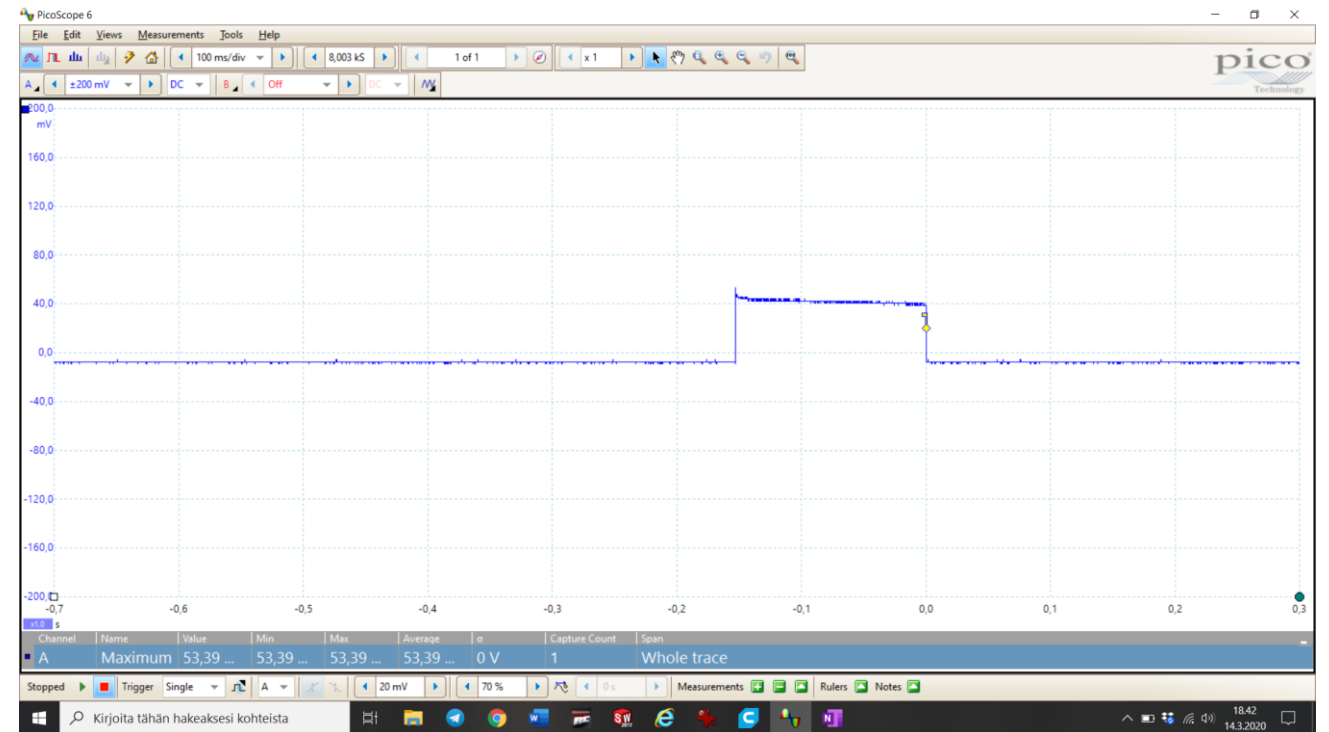
X85-CF

Battery: 4S 1300 mAh

Voltage: 15.19 V (storage charge)

Y-axis: amperes

X-axis: seconds



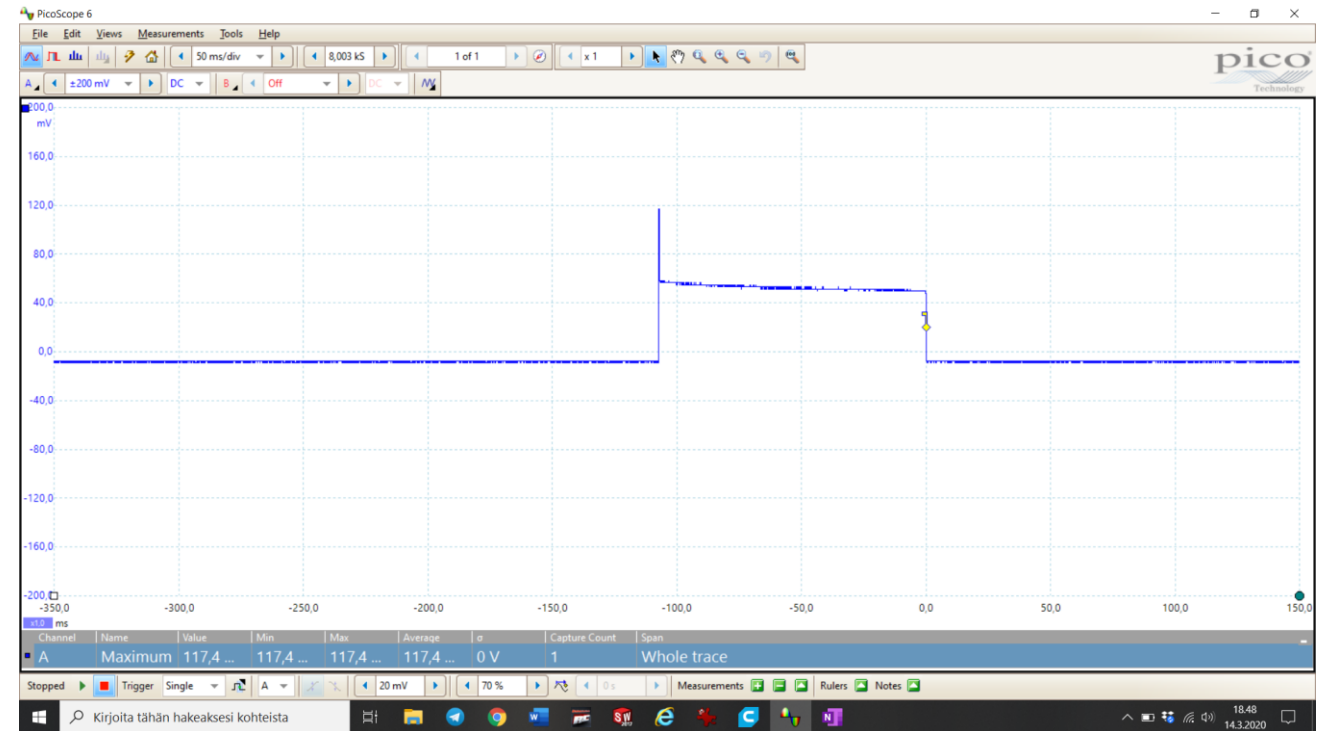
X85-CF

Battery: 4S 1300 mAh

Voltage: 16.80 V (full charge)

Y-axis: amperes

X-axis: milliseconds



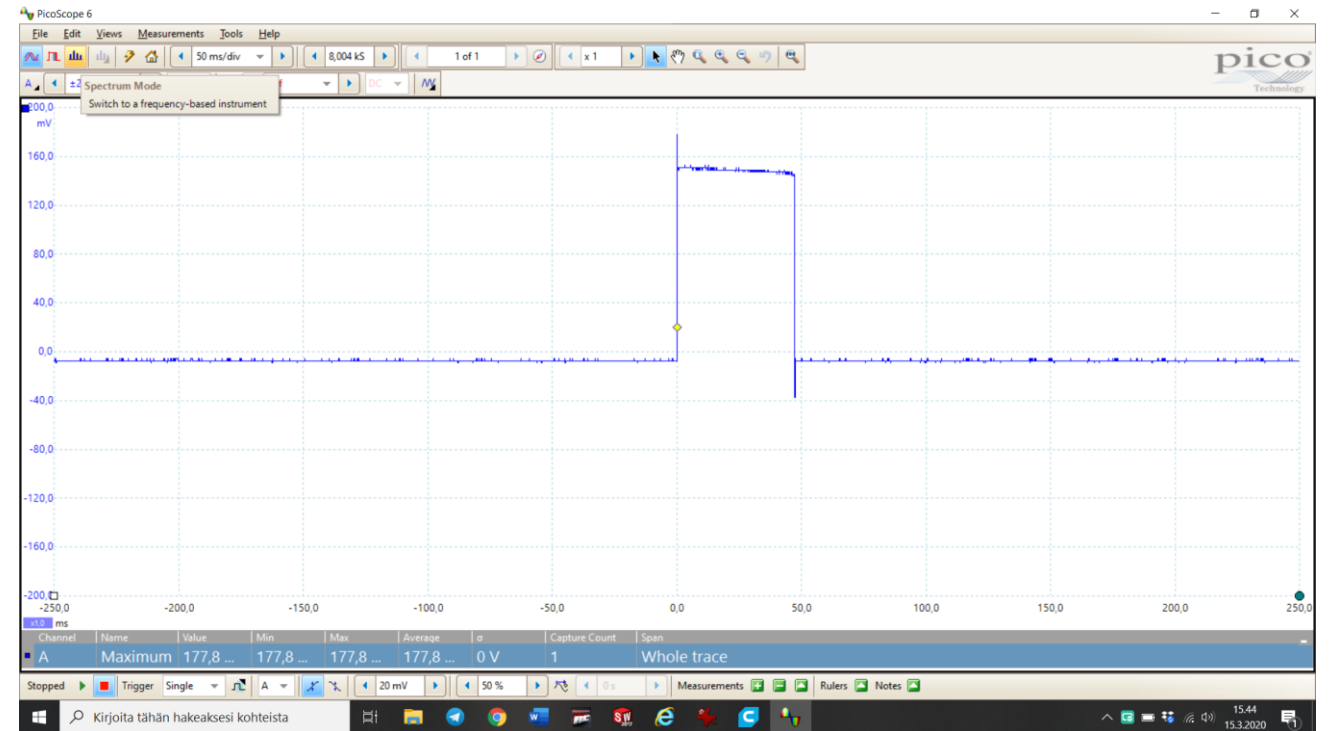
X85-CF

Battery: 6S 12 Ah

Voltage: 25.2 V (full charge)

Y-axis: amperes

X-axis: milliseconds



X85-CF

Battery: 12S 6 Ah, with extra resistor on launcher circuit (made on request)

Trigger: V2 (only compatible with 12S, and only with a pre-resistor)

Voltage: 50.2 V (full charge)

Y-axis: amperes

X-axis, upper image: milliseconds

X-axis, lower image: microseconds (highest peak and its duration)

