# Seriously Pro

Racing F3 Mini Flight Controller



Thank you for directly supporting the Cleanflight project with your purchase.

## About

The Seriously Pro Racing F3 Mini Flight Controller (SPRacingF3Mini) was designed to give awesome flight performance in a tiny race-ready package. It has the latest sensors, race timing and logging technology in a flexible form factor and also features a built-in voltage regulator (BEC).

Featuring a race timing transponder system the SPRacingF3Mini is truly designed for racers. Analyze your race and flight telemetry/blackbox logs using the built-in MicroSD card socket.

The SPRacingF3Mini gives you all the features you need for the heart of your aircraft, whether you're into FPV racing, acrobatic flying or aerial photography it's perfect.

## Features

* Next-generation STM32 F3 processor with hardware floating point unit for efficient flight calculations and faster ARM-Cortex M4 core.
* MicroSD-Card socket for black box flight log recorder - optimize your tuning and see the results of your setup without guesswork.
* Race transponder built in - just turn up at a race and have your lap times recorded.
* Onboard regulator (BEC) for powering the FC, receiver and small servos.
* Features the latest Accelerometer, Gyro and Mag/Compass and Baro/Altitude sensor technology.
* 2 Buttons for binding Spektrum Satellite receivers, activating USB bootloader mode or resetting the configuration. More future uses coming!
* Wire up using using pin headers for all major connections for excellent crash-durability. Use either right-angled or straight pin-headers.
* No compromise I/O. Use all the features all the time; e.g. Connect your USB + OSD + SmartPort + SBus + GPS + LED Strip + Battery Monitoring + Sonar + 8 motors - all at the same time!
* 8 PWM output lines for ESCs and Servos. Arranged for easy wiring on standard pin headers.
* Supports direct connection of SBus, SumH, SumD, Spektrum1024/2048, XBus receivers. No external inverters required (built-in).
* Supports direct connection of 3.3v Spektrum Satellite receivers via 3 pin through-hole JST-ZH connector.
* Dedicated PPM receiver input.
* 3 Serial Ports - NOT shared with the USB socket.
* Telemetry port (via pin header or USART2 JST-SH socket).
* Micro USB socket.
* Dedicated output for programmable LEDs - great for orientation, racing and night flying. (Currently mutually exclusive with the Transponder).
* Dedicated I2C port for connection of OLED display without needing flight battery.
* Battery monitoring for voltage and current.
* RSSI monitoring (analogue or PWM).
* Buzzer port for audible warnings and notifications.
* Developer friendly debugging port (SWD) and boot mode selection, unbrickable bootloader.
* Symmetrical design for a super tidy wiring.
* JST-SH sockets only for I2C/UART2 and SWD.
* Barometer mounted on the bottom of the board for easy wind isolation.
* Flashing via USB or serial port.
* Stackable design - perfect for integrating with OSDs and power distribution boards.
* Modular design - the core of the board measures 36x22mm but has the ability to be mounted using standard 30.5mm mounting holes.
* LEDs for 3v, 5v and Status for easy diagnostics.
* Copper-etched Cleanflight and #RB logos.

## Software

The SPRacingF3Mini runs the open-source Cleanflight flight control (FC) software which has an ever-growing community of friendly developers and users. Being open-source means that you too can contribute to the system.

Cleanflight comes with a detailed manual that is reviewed and maintained by the Cleanflight developers and community. No more out-of-date wiki pages and second-hand information.

See http://cleanflight.com for links to the manual. PDF copies can be downloaded from the github releases pages. Ensure you reference the manual that is appropriate to your firmware version.

## History

The hardware was designed by the lead developer of Cleanflight, Dominic Clifton, to be more capable than the previous-generation STM32F1-based boards and to set the benchmark for a fully-featured STM32F3-based mini board.

# WARNINGS

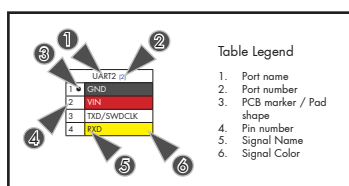Failure to adhere to these warnings will void your warranty and destroy your flight controller.

- When using ESCs that support active braking or battery regeneration ensure the FC is protected with a power supply filter.  Damage to the FC caused by lack of protection is not warrantable.
- Observe polarity at ALL TIMES.  Check and DOUBLE CHECK before applying power.  Do not rely on wire color-coding alone.
- POWER OFF before unplugging, plugging in or making any connections.
- Only use 2S to 4S batteries via the BATTERY connection.  18V MAX.
- Connect only one 5.0v SOURCE of power to the VIN pins / Do not connect more than one SOURCE of power to two or more of the VIN pins.  e.g.  If you are using ESCs with BECs then remove the center RED wire from all but one ESC connector.
- Do not connect SOURCES of power to the pins marked with 5v. They are OUTPUTS for supplying power to other devices.
- Do not connect a LiPo to the 5.0v VIN pins.
- The 3.3v supply is for low-current use only. 100mA MAX.
- Do not use a VIN voltage source higher than 5.0v.  Check your 5v supply is actually outputting 5.0 volts, check it before powering the FC via VIN. - do not just assume it is 5v.
- Do not connect GND, 5v, VIN or 3.3v to each other (short circuit).
- Do not connect GND, 5v, VIN or 3.3v to any inputs or outputs unless specifically stated.
- Do not connect any input or output to any other input or output unless specifically stated.
- Do not allow dirt/dust/glue/etc into the pressure sensor (barometer).
- Keep magnets away from the flight controller.
- Do not use excessive force when pressing the buttons.
- Do not use excessive force when inserting or removing MicroSD cards.
- Always align USB plug and socket when inserting/removing USB cables to prevent damage to the USB socket.
- Do not draw more than 1A from the 5V regulator (sum of all current used by 5v and VIN connected devices).
- When detaching break-off tabs support main section of PCB and use grips on the edges parts that are to be removed - do NOT squash any components.  Ensure you watch the instructional video BEFORE attempting to break off tabs. See website for video.

# GENERAL ADVICE

Follow the advice below for best performance and long-life of your flight controller:

- Apply resin/glue to reinforce JST-SH connectors - helps if you crash your aircraft.
- To further protect the board from crashes you can add a some additional solder to the edges of the JST-SH and USB sockets to reinforce them.
- The PCB has triangle-shaped pads on the corners, you can solder-bridge them to PCB header pins in adjacent holes to reinforce the corners.  The triangle pads are electrically isolated.
- Support JST connector sockets when inserting cables.
- Ensure your MicroUSB cable does not contact the PCB edge.  Use a different USB cable or trim your cable plug to fit if required. Do NOT force the cable in if the plug is too big.
- Using an enclosure/box for the flight-controller is recommended.
- Install open-cell foam under the pressure sensor - sandwich some between the FC and frame.
- Route motor/battery wires as far away from the compass sensor (magnetometer) as possible.
- Using color coded pin headers is recommended (not supplied), especially for BATTERY connections.
- For optimum performance do everything you can to prevent vibrations reaching the accelerometer/gyro sensor.  e.g. balance motors, props use rubber isolation grommets and secure everything.

1. UART3 headers.
2. Spektrum Satellite JST-ZH socket holes.
3. Battery headers.
4. Current/RSSI headers.
5. PWM 7-8 headers.
6. PWM 5-6 headers.
7. UART1 and PPM headers.
8. BOOT Pads.
9. VIN-5v Bridge Pads.
10. SWD debugging socket.
11. BUZZER headers & 3v3 Pad.
12. UART2/LED/IR headers and VIN pad.
13. PWM 1-4 headers.
14. IR LED headers.

A. 5V OK LED.
B. 5V 1A Voltage Regulator.
C. STM32F303 processor with FPU.
D. 3v3 Voltage Regulator.
E. Orientation Indicator.
F. 2 Buttons.
G. MicroUSB socket.
H. Accelerometer, Gyro and Magnetometer (Compass) sensor.
I. M3 mounting holes.
J. STATUS LED.
K. 3V3 OK LED.

**Table Legend**

1. Port name
2. Port number
3. PCB marker / Pad shape
4. Pin number
5. Signal Name
6. Signal Color

| UART3 (1) | |
|---|---|
| 1 ■ | RXD (R3) |
| 2 ● | TXD (T3) |

| Spektrum Satellite (2) | |
|---|---|
| 1 ■ | RXD (R3) |
| 2 ● | GND |
| 3 ● | 3.3v |

| BATTERY (3) | |
|---|---|
| 1 ■ | +V (Battery Positive) |
| 2 ● | GND |

| CURRENT / RSSI (4) | |
|---|---|
| 1 ■ | CURRENT |
| 2 ● | RSSI (PWM) |

| PWM 1-8 ESC/SERVO OUTPUTS (5/6/13) | |
|---|---|
| 1 ■ | PWM/ONESHOT125 |
| 2 ● | VIN |
| 3 ● | GND |

| UART1/PPM (7) | |
|---|---|
| 1 ■ | PPM |
| 2 ● | 5v |
| 3 ● | GND |
| 4 ● | 5v |
| 5 ● | RXD (R1) |
| 6 ● | TXD (T1) |

| BOOT (8) | |
|---|---|
| 1 ■ | 3.3v |
| 2 ■ | BOOT |

| VIN-5v PADS (9) | |
|---|---|
| 1 ▲ | 5v |
| 2 ▼ | VIN |

| SWD/DEBUG (10) | |
|---|---|
| 1 ● | GND |
| 2 R | NRST |
| 3 D | SWDIO |
| 4 C | SWDCLK |

UART3
Use for GPS/OSD/SerialRX.  IMPORTANT: 3.3v ONLY signals.

Spektrum Satellite socket holes.

Holes ready to install a top-mount or side-mount through hole JST-ZH 3 pin socket for connecting to a Spektrum Satellite receiver.

BATTERY  - WARNING: DOUBLE CHECK and TRIPLE CHECK POLARITY!

For connecting a 2-4S LiPo battery (6.6V MIN / 18V MAX).  Use to power the board and accessories.  Also supplies power to the 5V regulator and 5v PINS.  Can be used to power VIN pins when VIN-5v Pads are bridged.

IMPORTANT: WHEN USING ESCS WITH ACTIVE BRAKING OR REGENERATION ENSURE A POWER FILTER IS USED.

CURRENT / RSSI

Current - 0 - 3.3v input from external current sensor for current monitoring.

RSSI is for 0 - 5v PWM RSSI.

ESC/SERVO OUTPUTS.

2x6 Pin and 1x12 Pin headers for connecting servos/motors.  ALL VIN holes are connected to each other.  VIN can be used to power the board.  When VIN-5v Pads are bridged only connect OUTPUTs to VIN holes.

UART1/PPM - Serial RX/OSD & PPM RX

When using a PPM receiver connect a 3 pin cable to pins 1,2,3.

When using a Serial RX receiver (S.Bus, SUMD/H, etc.) use pins 3,4,5

When using OSD/GPS use pins 3,4,5,6.

5v is supplied also when connecting via USB.

Boot Headers - Used for recovering firmware

No connection = Boot Normally
Bridged = STM32 Bootloader

VIN-5v Pads

Not bridged = No OUTPUT to VIN pads. VIN can be used to power FC via D1.
Bridged = VIN (5V Regulator or USB) OUTPUT power supplied to VIN pads.

SWD/DEBUG connector - Used for software development or flashing via SWD

Cannot be used when UART2 is enabled.  Use an ST-Link debugger with OpenOCD or a J-Link debugger.

If for some reason you cannot flash using USB DFU or UART1 you can reinstall firmware using this port.

| BUZZER (11) | |
|---|---|
| 1 ■ 3.3v (PAD) | |
| 2 □ 5v | |
| 3 ● GND | |
| 4 ● BUZZER- (B-) | |

## BUZZER

Use 5V and BUZZER- to connect to an external buzzer.

5.0v and 3.3v are always supplied via the on-board voltage regulators, even when powering via USB.

| UART2/TELEMETRY/LED/IR (12) | |
|---|---|
| 1 ■ VIN (PAD) | |
| 2 ● IR/LED Strip | |
| 3 □ TXD (T2) | |
| 4 ● GND | |

## UART2/TELEMETRY/LED/IR

TXD (T2) Cannot be used when SWD is in use.  For connecting to telemetry port (FrSky/HoTT/etc).

IR/LED cannot be used when transponder unit is attached and enabled.  Pin is to allow transponder section to be detached and reconnected OR for use with WS2812 LED strips when transponder is NOT used.

| IR LED | |
|---|---|
| 1 ■ IR + | |
| 2 ● IR - | |

## IR LED

Used to connect two IR LEDs when using transponder feature.  One LED per pair of holes.  One LED each side.  Do NOT connect two LEDs to one pair of holes.

The LONG leg of the LED goes in the SQUARE hole.  The SHORT leg of the LED goes in the ROUND hole.

## NOTE:

Rev-E boards have a misprint on the silk screen for IR+ and IR-.  Use the pad shapes to determine correct signal.

You can check the transponder LED is working by using a mobile phone camera pointed straight at the LED when the transponder is enabled via the board and in the software.  The LED will pulse an infrared signal which usually shows up purple via a mobile phone camera.

# BOTTOM



1. Sonar Pads
2. Button Pads
3. Analogue RSSI Pad
4. I2C1 connector
5. UART2 connector
6. Transponder Enable Bridge Pads
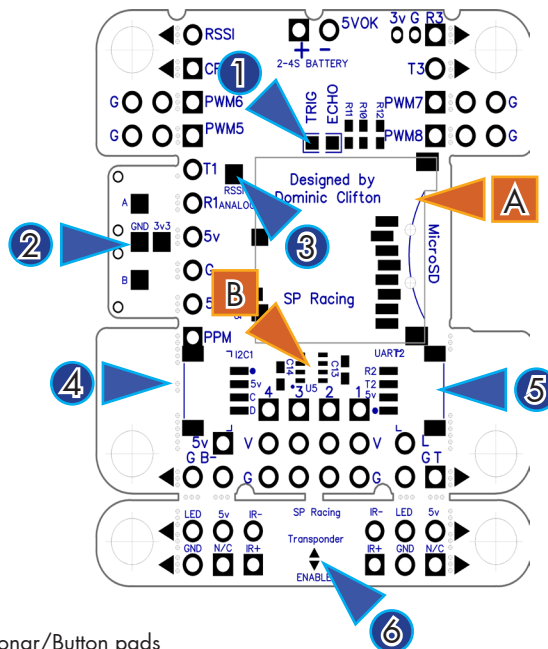
A. MicroSD card socket
B. Barometer (Pressure Sensor)

| SONAR/BUTTON PADS (1/3) |
|---|
| ■ TRIG / Button B |
| ■ ECHO / Button A |

## Sonar/Button pads

Buttons are enabled by default.  When buttons are not used Sonar can be used instead.
Pads can be used to re-attach button panel.

| RSSI Analog (3) |
|---|
| ■ RSSI Analog |

## RSSI Analog pad

Use instead of RSSI though-hole pin for use with 0 - 3.3v analogue RSSI receivers.

| I2C1 (4) | |
|---|---|
| 1 ● GND | |
| 2 5v | |
| 3 SCL | |
| 4 SDA | |

## I2C1 connector - Used for external sensors and OLED displays.

The SCL and SDA are 3.3v signals.

5.0v is always supplied via the on-board voltage regulators, even when powering via USB.

IMPORTANT: logic level converters are REQUIRED if your sensors use 5.0v signals.

| UART2 (5) | |
|---|---|
| 1 ● GND | |
| 2 5v | |
| 3 TXD/SWDCLK | |
| 4 RXD | |

## UART2 connector - Used for 5.0v Serial IO. (GPS, etc.)

MUST NOT be used when SWD port is in use.

5.0v is always supplied via the on-board voltage regulators, even when powering via USB.

| TRANSPONDER ENABLE (6) | |
|---|---|
| 1 ▲ LED | |
| 2 ▼ TRANSPONDER_IN | |

## Transponder Enable Bridge Pads

Not bridged = Transponder DISABLED.  LED/IR pad CAN be used for LED Strip.
Bridged = Transponder ENABLED - LED/IR pad CANNOT be used for LED Strip.

## Soldering

The flight controller is supplied with a bag of pin-headers.  Some are straight, some are right-angled.  Choose very carefully which ones you want to use.  You can solder headers to top or the bottom of the board.

Once you have soldered pin headers in place DO NOT attempt to remove them unless you are highly skilled in de-soldering and have the correct tools.  Overheating the board or components will destroy it.

## Cables

The flight controller is not supplied with any cables.  There are sockets for 2 4-pin JST-SH plugs/cables.

IMPORTANT: Ensure that you leave some slack in your cable routing as this will help if you crash your aircraft.

Cables are available from your retailer.

Do not rely on cable color-coding due to manufacturer variations. Always check before applying power.

## Buttons

The buttons can currently be used for Spektrum Satellite binding, rebooting into the bootloader (when firmware is operational) or resetting the configuration to defaults.  See the Cleanflight software manual for further details.

Button press timing, corresponding status LED patterns and functionality is subject to change as this new feature develops.

If you have ideas for additional button usages please submit via the Cleanflight issue tracker.

## MicroSD Card

The MicroSD socket allows MicroSD/SDHC/SDXC to be inserted.

HOWEVER, Currently only MicroSD and MicroSDHC are supported.  MicroSDXC is NOT currently supported by Cleanflight.

For full details on how to enable logging,  SD card speed requirements and how to view logs please see the Cleanflight software manual.

Your aircraft will fly better if you analyze your logs and tune accordingly.

# Getting started

Verify flight controller operation via the configuration software.

- Disconnect the flight controller from your computer.
- Disconnect ALL connectors and headers from the flight controller.
- Install latest STM32 Virtual COM Port Driver
  http://www.st.com/web/en/catalog/tools/PF257938
- Install and launch the Cleanflight Configurator tool
  https://chrome.google.com/webstore/detail/cleanflight-configurator/enacoimjcgeinfnnnpajinjgmkahmfgb
- Connect flight controller to computer via USB cable.
- Select the correct COM port if it is not automatically detected.
- Click connect, verify that communication is established. (Fig 3)
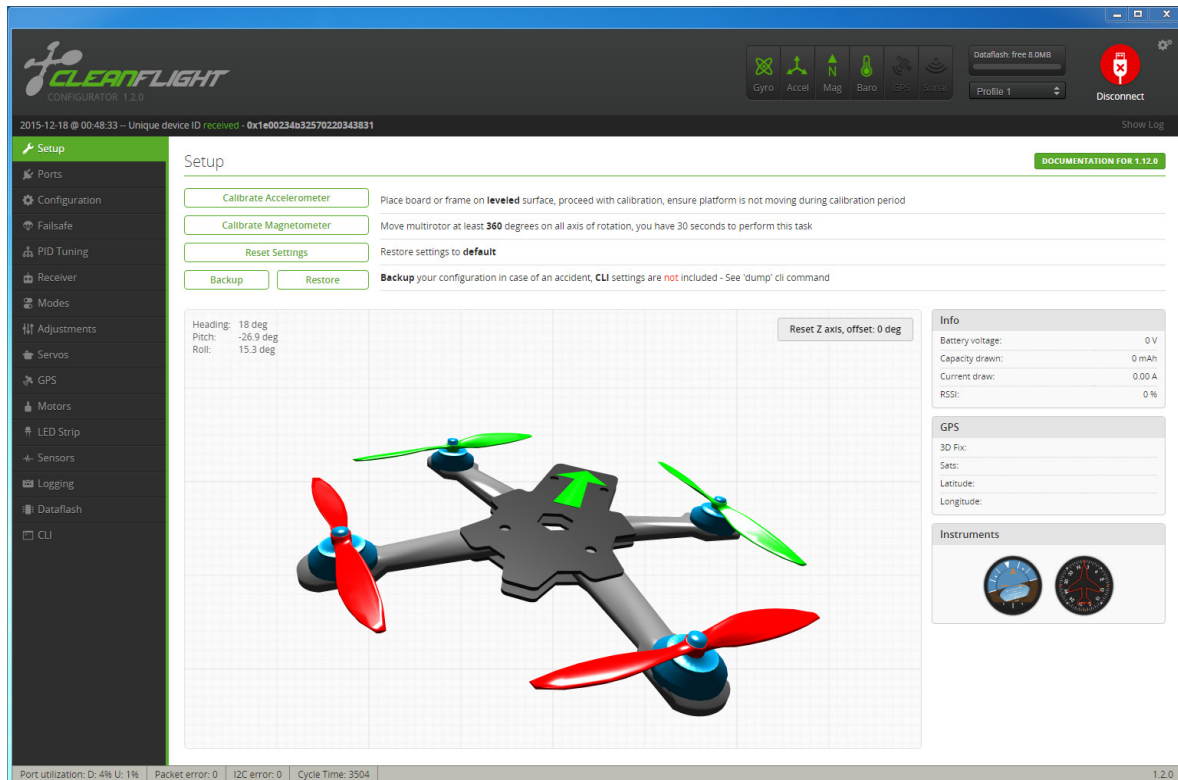


[Figure 3 - Setup tab after connection established]

- Verify all sensors on your board are giving correct readings. (Fig 4)

[Figure 4 - Sensors tab showing all sensors.

Disconnect and upgrade the firmware using the Cleanflight configurator tool. (See Firmware Upgrade section)

For further software configuration see the getting started guide in the Cleanflight manual.

The basic steps, after firmware upgrade, are as follows.
- Choose board alignment - you can mount it in any orientation, not just with the arrow facing forwards.
- Calibrate sensors.
- Configure serial ports.
- Choose model/mixer (default is Quad X)
- Enable features.
- Configure receiver, set channel mapping.
- Configure channel mid and endpoints (1000-2000) and trim channels on transmitter.
- Configure voltage monitoring.
- Configure outputs (servos/ESCs)
- Ensure ESC calibration matches ESC configuration, recalibrate ESCs if needed.
- Learn about flight modes and configure channels/switches to activate them as required.
- Learn how to arm/disarm.
- Bench-test failsafe.
- Read safety notes.
- Learn how to download and view your flight logs to help tune your aircraft.
- Insert correctly formatted MicroSD/SDHC Card before your first flight (so you have a log).
- Learn how to recognise un-tuned flight characteristics and the effects of a PID controller. (Watch some videos).
- First flight should be in Acro/Rate mode (the default mode when no other modes are active).
- Tune PIDs.
- Backup settings.
- Contribute to the Cleanflight project with feedback, suggestions, code, etc.

## Firmware Upgrade

It is highly recommended that you immediately upgrade the firmware of the flight controller so that you have the latest features and bug fixes. DO NOT FLY until you have installed the latest CLEANFLIGHT firmware.

On Windows USB DFU drivers must be installed. See the Cleanflight manual for latest installation instructions.

1. Click the Firmware Flasher tab.
2. Select the correct COM port and speed, use the default speed unless you have changed it on the FC.
3. Select the latest "SPRACINGF3MINI" stable release. (Do not use "SPRACINGF3" or other targets). If no firmware is currently available do NOT attempt to flash. NOTE: Flashing the wrong firmware can cause the FC to be permanently damaged.
4. Click 'Load firmware [Online]' and wait for firmware to download and read release notes before flashing.
5. Click 'Flash Firmware'. At this point the FC will reboot into DFU mode. DFU will appear in the list of ports and flashing via DFU will proceed. After flashing the virtual COM port will re-appear.
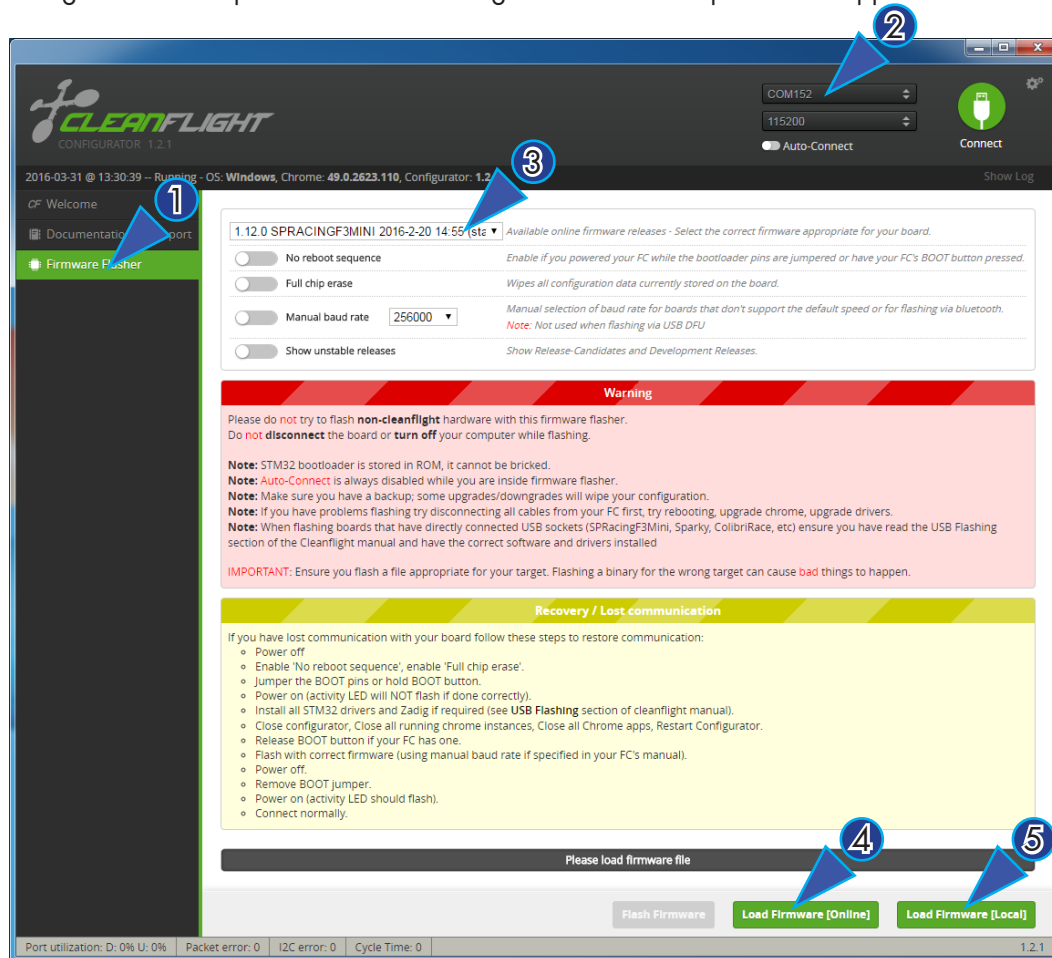


IMPORTANT: Verify operation using latest CLEANFLIGHT firmware before attempting to use alternative firmware. Not all features may be supported by alternative firmware.

## Troubleshooting

Q: Unable to flash firmware via DFU.
A: Likely the correct DFU drivers are not installed. Put the board in BOOTLOADER mode (jump boot pins, connect USB cable). Then update DFU drivers. See USB Flashing section of Cleanflight manual for details.

Q: The COM port does not show up.
A: Ensure latest USB STM VCP (Virtual Com Port) drivers are installed.

Q: It beeps continually.
A: Verify your RX is receiving data and your battery voltage monitoring is configured correctly, verify that the board is aligned correctly and is not at an angle.

Q: I have no LED at all.

A: Check Battery or check 5v supply. (Battery Charged?, USB cable damaged?)

Q: The status LED never lights or is always on.
A: Follow recovery procedure in the configurator.  Likely caused by flashing wrong firmware.

Q: Unable to connect and a repeating light sequence occurs on the activity LED.
A: Check the Cleanflight manual for how to interpret the error code (count the long flashes).

Q: Unable to connect to the board (and status LED shows non-repeating pattern at boot-up).
A: Close all Chrome browsers and Chome apps, retry.  COM Port drivers not installed?  Try connecting via different UART OR Reset the board to defaults using buttons OR reflash firmware using 'full chip erase'. (Likely caused by mis-configuration of ports).

Q: Transponder code not recognised by receiver.
A: Check transponder enable bridge. Check IR LED orientation and light beam exit path. Ensure transponder feature enabled in software. Ensure transponder code correctly configured.

Q: The COM port does not show up after flashing firmware.
A: Wrong firmware was flashed; Use SPRACINGF3MINI target and follow recovery steps in the Cleanflight Configurator firmware flasher to restore the firmware.

Q: The receiver tab does not show any activity.
A: Check configuration tab - receiver mode.  Center sticks, configure endpoints and trim on transmitter.  Check ports tab if using Serial RX.  Check wiring.

Q: You have a problem not listed here.
A: Reset and/or upgrade the firmware, try again, report issues via the forums - links are in the configurator on the 'Documentation & Support' tab.  Before contacting your retailer reflash with latest CLEANFLIGHT and double check - perhaps the firmware you are using is old or incorrect?

## Transponder

The SPRacingF3Mini features a DUAL IR LED transponder system.  For optimum performance ensure you read the following section.

Mounting - Ensure that the IR LEDs can shine light from their installed location onto the track-side receiver, unobstructed.  e.g.  ensure that props, motors, arms, etc, are not in the way of the light shining from the LEDs.

Orientation - Ensure the LEDs point outwards from the aircraft towards the track-side receivers.  The more receivers you use the better the code reception will be.  You can mount the transponder so that the LEDs are on the same side or one on each side.  When mounting them on the same side mount them in a V pattern so they point slightly outwards from each other and not at the same point. You can mount them in a vertical V pattern; so the light shines on multiple receivers, or in a horizontal V pattern; so that one LED light shines on a receiver as the aircraft approaches and the other LED shines on the same receiver as the aircraft passes.  Race organizers should test what works best for their track and advise pilots before racing.  Pilots in doubt should ask their race organizer.

Relocation - The transponder section can be detached, relocated and reconnected to the board using the LED, 5v and GND pins.

Verifying operation - Ensure that the TRANSPONDER feature is enabled in Cleanflight.  Ensure that the ENABLE solder pads are bridged with solder.  Ensure that the TRANSPONDER code has been configured via the Race Transponder configuration section in the Cleanflight Configurator.  Once this is done you can use a CMOS/CCD camera without IR block pointed directly at the IR LEDs and you should see them pulsing.  A mobile phone camera works well for this, your FPV camera and screen/goggles may be OK if it doesn't block IR light.

Once you have verified that the IR LEDs pulse IR light then you can scan your SPRacingF3Mini past one of the iLAP receivers.  The iLAP receiver just needs power, no software configuration is required to verify that the code is working.

The first time the iLAP receiver can read the transponder code the LAP light will pulse once, while the iLAP receiver can read the code then the activity light (ACT) will be flashing.

Each time the LAP light flashes the receiver transmits transponder code and timing information via it's COM port

to the computer it is attached to.

By default the iLAP receivers will not transmit the transponder code to the PC twice in a row unless the transponder code has not been received for over one second.

For further iLAP receiver configuration and setup advice refer to the iLAP documentation.

## Hardware Specifications

- Full PCB 36x43mm.
- Main PCB section standard 36x36mm.
- Center section 36x24mm.
- Transponder section is 36x6mm.
- 30.5mm mounting holes on main section and on transponder section.
- Weight ~6 grams
- STM32F303 CPU, 72Mhz inc FPU, 256K Flash.
- MicroSD card slot (SD/SDHC, upto 32GB) via SPI
- MPU9250 accelerometer/gyro/compass via I2C
- BMP280 barometer (Deluxe only)
- 5V 1A Regulator for powering receiver and small servos
- 2 Push Buttons
- 2 IR LEDs and unique code for race transponder
- MicroUSB socket
- Copper-etched Cleanflight and #RB logos
- 1x 2pin though-holes for pin headers for Direct Connection of 2-4S Battery (18V Max)
- 8x 3pin though-holes for pin headers for ESC/Servo connections
- 1x 2pin though-holes for pin headers for UART3
- 1x 6pin though-holes for pin headers for UART1 and PPM (for standard SerialRX/SBus/PPM lead)
- 1x 3pin though-holes for pin headers for Telemetry/LED Strip
- 1x 3pin though-holes for pin headers for Buzzer output
- 1x 2pin though-holes for pin headers for RSSI and battery current monitoring
- 1x 3pin though-holes for JST-ZH socket for Spektrum Satellite receivers.
- 1x 4pin bottom mounted, recessed JST-SH socket for I2C
- 1x 4pin bottom mounted, recessed JST-SH socket for UART2
- 1x 4pin top mounted JST-SH socket for SWD debugging
- 2x bottom mounted solder pads for sonar

## Credits and acknowledgements

Hardware design by Dominic Clifton.
Manual by Dominic Clifton.
Seriously Pro website by Dominic Clifton.
Cleanflight firmware and GUI tools are maintained by Dominic Clifton.
Blackbox flight logging component, tools and SD Card support by Nicholas Sherlock.

The flight controller software is based on MultiWii by Alex Dubus.
The GUI tool was based on software by cTn.

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https://www.youtube.com/user/Painless360/playlists

Thanks to everyone who provided feedback on the SPRacingF3 Acro/Deluxe boards.

Software support and contributions from many, many authors. For a complete list see github contributors.
https://github.com/cleanflight/cleanflight/graphs/contributors

## Community

Thanks to everyone from the AWESOME Cleanflight community for code, artwork, support, ideas, feedback, and everything else. Without you all this product would not exist.