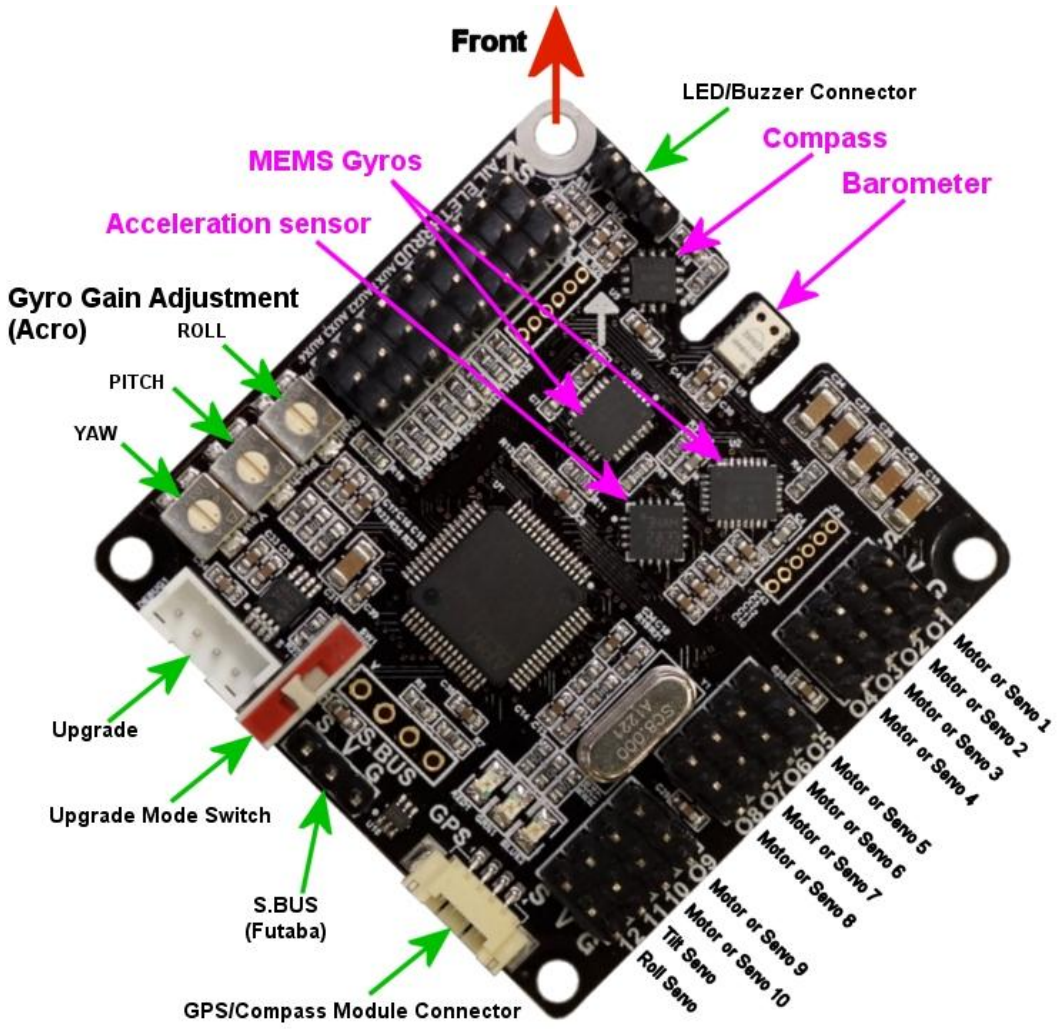
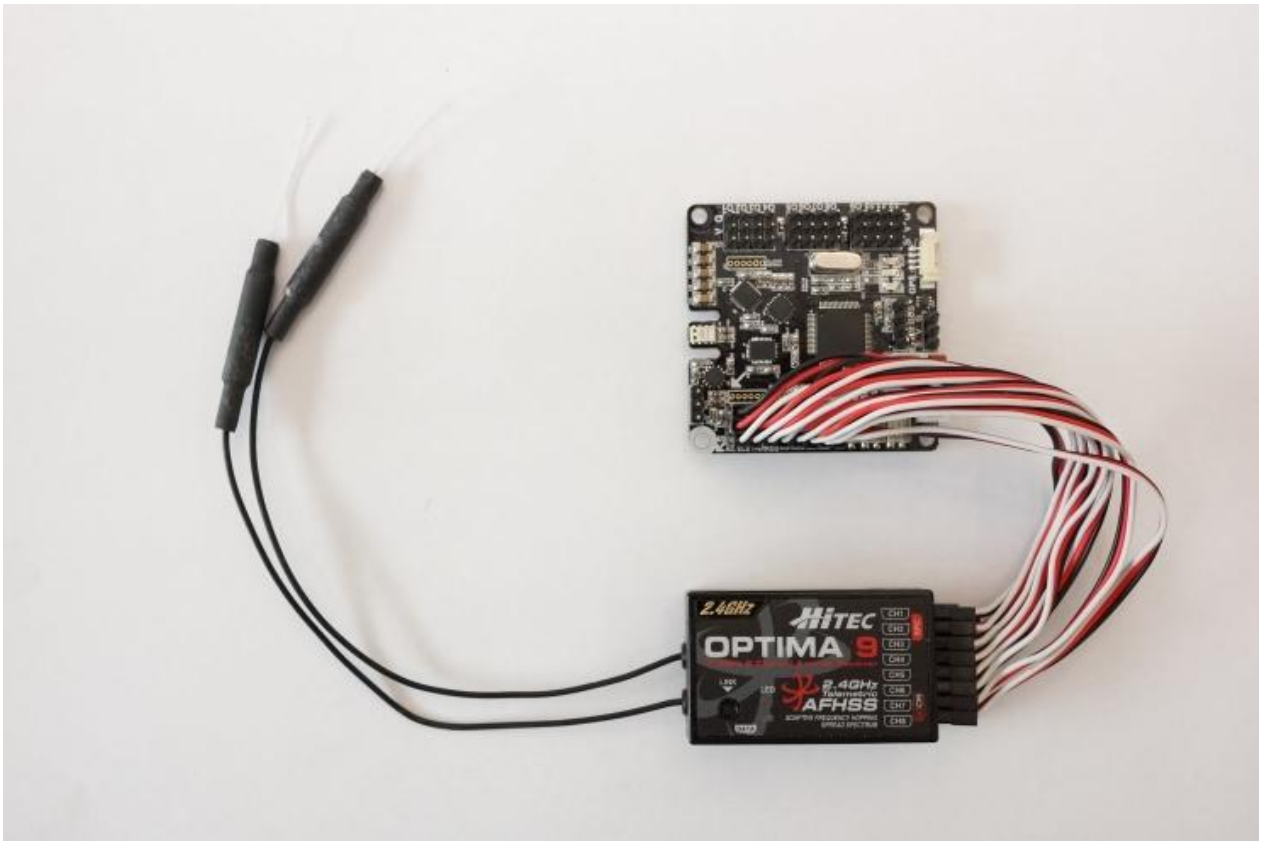
Setting Manual for FlyCam MCFC
The letters MCFC stand for FlyCam MultiCopter Flight Controller and it is called "Blackboard II".
This board can fly alone,and it is also possible to connect it to GPS/Compass Board or OSD board through its'receiver port.
the FlyCam MCFC offers more excellent function.

Feature of FlyCam MCFC
●Sensors
- Digital 3-Axis MEMS Gyroscope
- Digital 3-Axis Accelerometer
- Digital Barometer
- 3-Axis MagnetometerMulticopter stabilization controller
it is able to be more stable flight

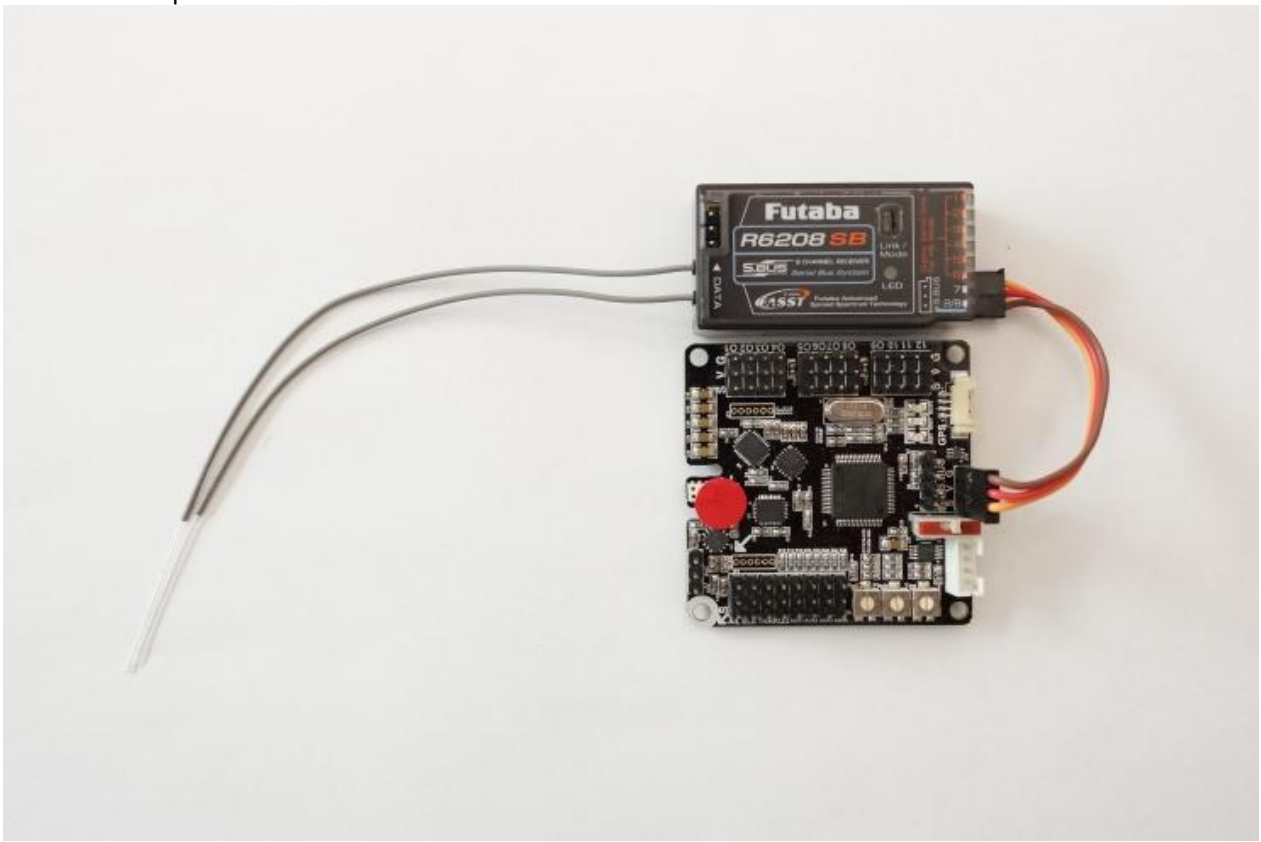
● 18types of multicopter support
● Gimbal stabilization function for roll and pitch.
- It is compatible with 2-axis gimbal.
● Supporting Futaba S-bus receiver.
- Compatible with 2.4Ghz
● Altitude Hold
● Care free(heading free)
● GPS Function
- GPS Care free
- Waypoint flight
- Follow me (with X-bee)
- GPS position hold(it can be changed by stick)
- Return to home(GPS position hold can be changed by stick)



Connecting with receiver
Connect the receiver port of the MCFC to receiver.
it can be connected to a maximum 8channel.
if use the futaba transmitter which supports S-bus, please connect s-bus port of the MCFC to receiver.



connect s-bus port of the MCFC to receiver.

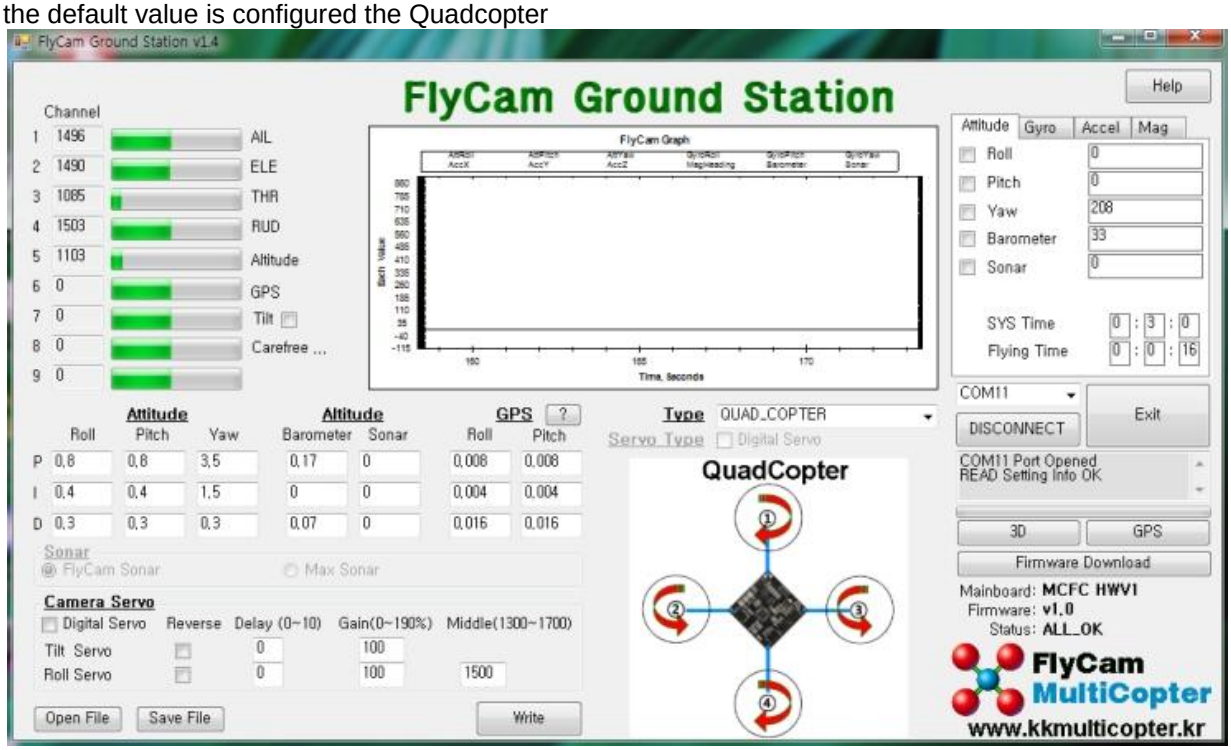


1'st channel : Aileron
2'nd channel : Elevator
3'rd channel : Throttle
4'th channel : Rudder
5'th channel : Maintain altitude (2 position switch on,off)
6'th channel : Autopilot by GPS (3 position switch,(0) Free Flight,(1'st) Position Hold,(2'nd) Coming Home)
7'th channel : Tilt servo control or change the Acro mode flight
8'th channel : To enable carefree(2'nd switch), waypoint or follow me should be assigned to 3'rd position switch of 8'th channel.
if waypoint has not been assigned to 3'rd position switch of 8'th channel,operate follow me (need X bee)
A minimum of 6 channels is required to operate the MCFC. We recommend the use of an RX with 9 or more channels
If the waypoint or follow me is not enabled, will be the function that the heading always toward to home during carefree.
When you plug in the power, the following beeping alarm will sound. If any flight mode switch is in its' active position,
the alarms are as follows:
- In the case of the throttle stick being up (Red LED light's)
- In the case of channel 5 being active or forgotten in "maintain altitude" position. (Green LED light's up)
- In the case of channel 6 being active or forgotten in "Position hold" or "Coming Home" (Blue LED light's up)
- In the case of channel 8 being active or forgotten in "care free" (Red LED light's up)

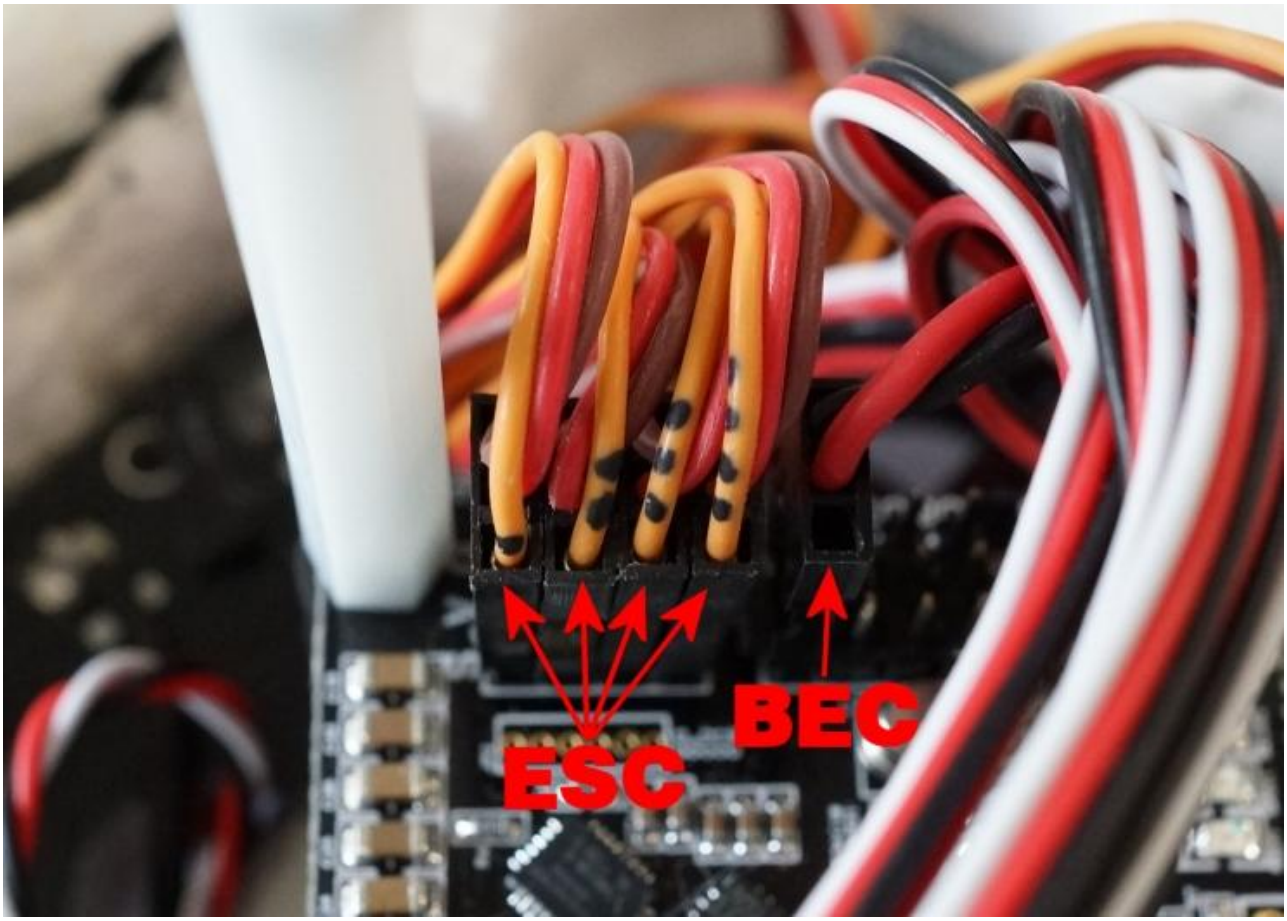
If you need to reverse the switch for altitude hold and GPS, please reverse a applicable channel in the Tx.
The Tx set with Air Plane mode and should be clear all mixing.
The travel range of all channel set with +- 100,also D/R setting is just the same.
If it decrease the travel of Tx, can't enter to each setting mode.

http://www.youtube.com/watch?v=26QBTQa5akw&feature=player_embedded

Setting a type of multicopter
Run the FlyCam Ground Station and set a type of multicopter.
the default value is configured the Quadcopter

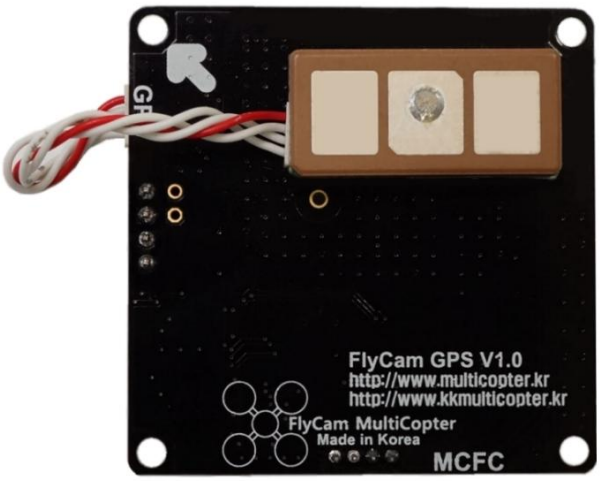


Connecting esc and servo
the number of motor is determined depending on the type of multicopter in the setting the FlyCam Ground Station.
the number of esc or servo that is connected with the motor is determined.
connect the number of the MCFC'motor/servo to the number of esc or servo corresponding the number of port.

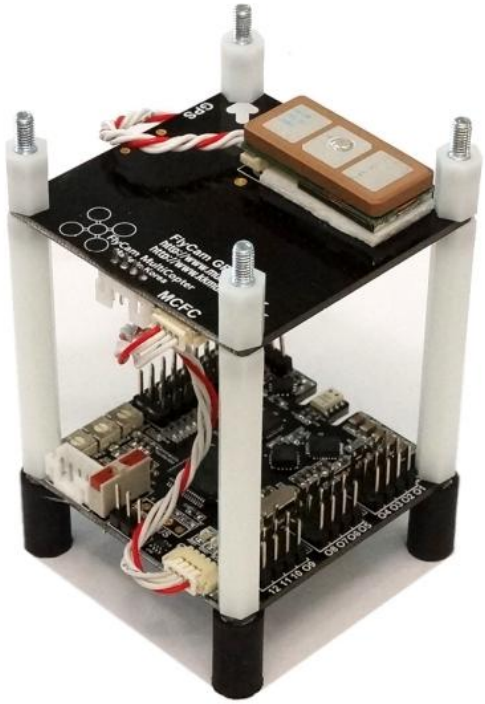


Connecting BEC
In the case of esc with the regulator cut the cable's signal red (+) wire or remove it from the connector.
it connect the power of bec to the battery used to power,5V output of bec connect to the spare motor / servo port of MCFC or the power port of receiver.
it should be noted connecting of positive and negative.

Connecting the GPS/ Compass board
Add PCB supports(50mm) 4pcs on to the MCFC and insert the GPS/Compass, the plate can be secured by further screwing supports or nuts, and it's now ready for connection to the RX.
Arrows should be mounted forward.
the GPS/Compass board is connected a GPS module and fixed with double sided tape or mounting to a higher place
we recommend to mount as shown below.



The GPS/Compass board mounted on to a MCFC as shown below



Setting the FlyCam MCFC
the setting of the MCFC is as follows,If you need only to set 8,9channel
1. Setting transmitter channels
2. Stick Centering
3 ESC throttle calibration and Battery type
4. Calibration Compass
5. Arming
6. Disarming
7. Calibration Gyro & Accelerometer
8. Setting the potentiometer
9. Factory default

1. Setting transmitter channels

CHANNEL	Aileron	Elevator	Throttle	Rudder
JR/SPEKTRUM	REVERSE	REVERSE	NORMAL	REVERSE
FUTABA	NORMAL	NORMAL	REVERSE	NORMAL
HITEC	NORMAL	REVERSE	NORMAL	NORMAL
Others				

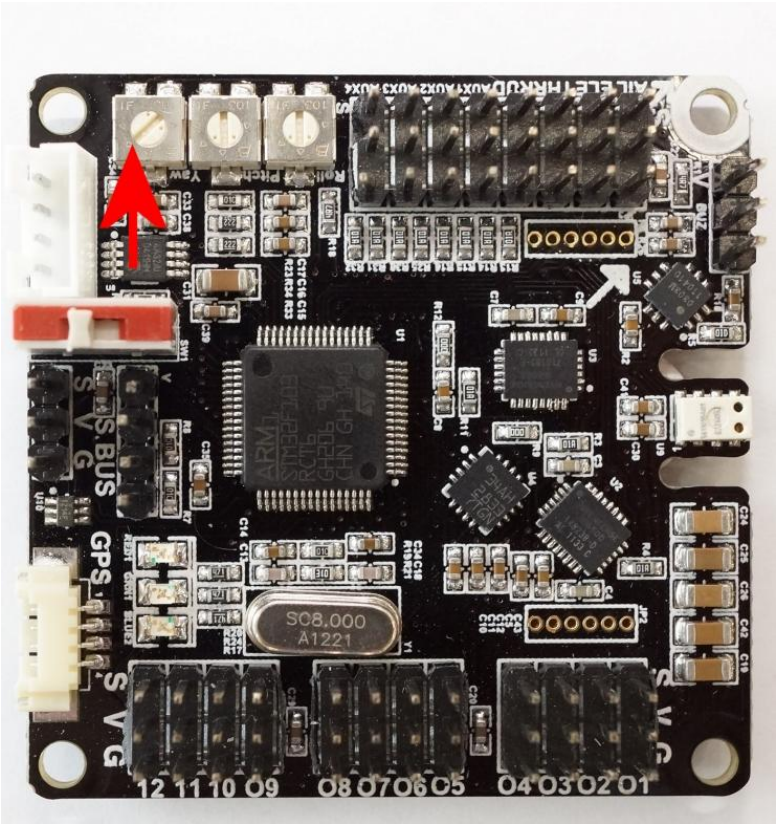
The Tx set with Air Plane mode and should be clear all mixing.

2. Stick Centering
Lower the TX elevator stick to the bottom and hold it there for three seconds; the sounder will beep followed by the LED lighting.
Center the elevator stick and wait for two seconds; the sounder will beep now the stick center has been learnt.
If this operation has not been successful,the multicopter will lean when take off, and will require a lot of trim in the Tx to remain stabilization.
Please refer to the stick position figure below for your chosen mode

http://www.youtube.com/watch?v=_YDMgULFU6M&feature=player_embedded

3.ESC throttle calibration and Battery type

For safety, Don't install the propeller.
please refer to the manual of esc
+ throttle range setting.
+ Battery type NiCd/NiMh setting(Don't set to Li-Po)
- Set the yaw pot to zero(anticlockwise)



- Turn on the Tx and higher the TX throttle stick to the top.
- Turn on the board
- Check the Rx power
- Wait for three seconds(ignor the beep sound)
- the led blinks three times
  Wait until until the sounder will beep for esc
- lower the TX throttle stick to the bottom
- wait until the sounder will beep for esc
- Turn off the board
- Set the yaw pot to middle.

4.Calibration Compass

Move and hold the elevator stick to the left for three seconds. The sounder will beep and the Blue and Red LED will be flashing.
Take hold of the copter in both hands and rotate it as described below
Tilt it 90 degrees though its pitch axes (tilting front to back) and roll axes. (tilting left to right)
Repeat this step until the sounder will beeb once, twice and three times.
During the above procedure, be sure to avoid any metal objects such as a car, or high-tension electrical cables; these distort the magnetic field around them etc.

http://www.youtube.com/watch?v=4Q0424lNyoo&feature=player_embedded

5. Arming

Move and hold the rudder stick to the right for 0.5 seconds and the sounder will beep and the Red LED will light.
if the red LED will be flashing,the magnetometer has not been initialized or distort the magnetic field around.
if not in the right direction. Swap any motor wire of three connecting cable.

6.Disarming

Move and hold the left rudder stick for 0.5 seconds. The sounder will beep twice and the Red LED will turn off.

7.Calibration Gyro & Acceleration.

Move the rudder stick to the right for three seconds the sounder beeps and the sounder will beep as it arms.

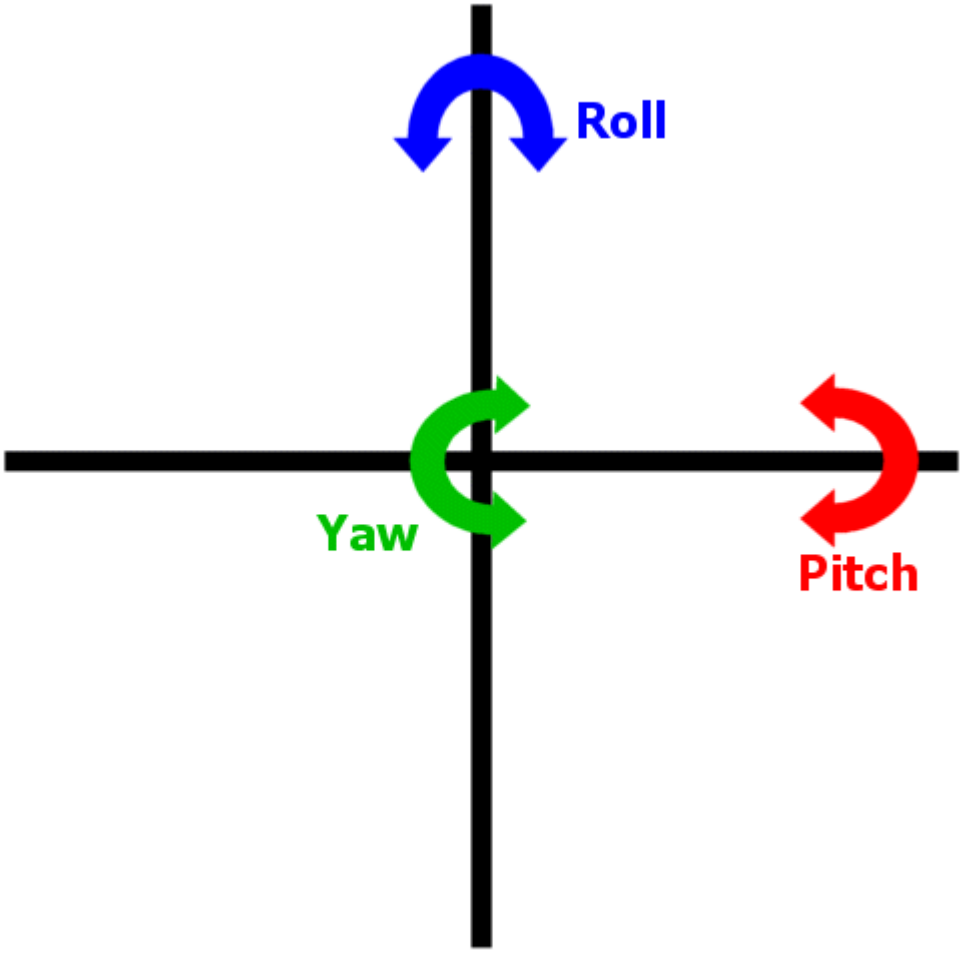
This operation should precede the first attempt at maintaining level flight. It is not necessary to repeat it every time.

If it's not done the copter will lean.

8.Setting the potentiometer

The MCFC is equipped with 4 pots.Roll, Pitch gain is only available a acrobatic flight.

Turning the pot clock wise (CW) will increase the sensitivity, and counter clock wise (CCW) will decrease sensitivity.



- increase gain : turning the pot clock wise
- decrease gain : turning counter clock wise
- when switch the acrobatic mode, increase until jitter and decrease a little.
- if roll from the side to side, decrease the roll gain. if pitch the front and back, decrease the pitch gain.
- the high gain is stable, but sluggish response of the stick.If the gain is low, becomes sensitive to the response of
  the stick.

9.Factory default

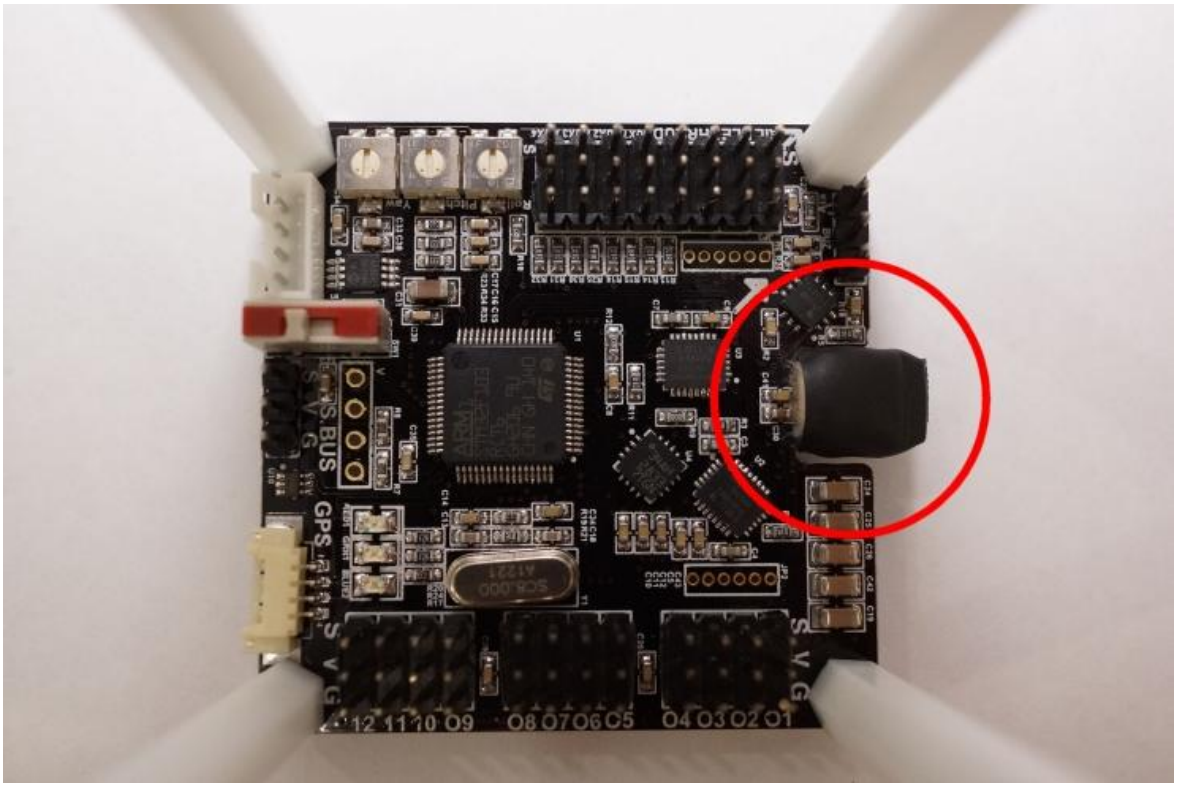
Turn Roll,Pitch and Yaw to CCW and plug in the power and this will initialize the factory stored setting of the MCFC.

Barometer protection

The barometer is sensitive to temperature changes and moving air around it.

To resolve the phenomenon of air pressure changing by the wind,After covering cotton, etc and must be fixed with
the shrink tube.

Do not tape it in place with double sided tape over the small hole of the barometer.



Getting ready to fly

Plug in the power and must be checked the GPS status before arming, If the blue LED is blinking, do not fly.
please wait until you will be heard the beep sound once and the blue LED lights up solid.
please check the GPS LED on the NaviBoard again before arming. it must be check the blue LED light is solid you are
ready to fly.
Remember that the arming position will be the home position.

Waypoint

How to register the location in PC.

You can register the waypoint with mouse click and drag through google map in running FlyCam Ground Station v1.1.
If the copter goes into the radius of the check point, is regarded to be passing the check point.
If set the radius to 0m, set automatically the radius to 5 ~ 10m based on the status of the GPS.
"wait" after the copter goes into the radius, set wait time with seconds.
"heading" when the copter is heading for the check point, turn heading to check point or not.
If you check heading, is always heading for the check point.
In this case, you can turn heading by rudder stick but if the stick release, the heading change automatically for the check
point.
To transfer from the register waypoint to the navi board, press " Write Waypoint".
To display a storage waypoint in the naviboard, press " Read Waypoint".
Please refer to the video below for more information.

http://www.youtube.com/watch?feature=player_embedded&v=YVL1nZjf-MY

How to run the waypoint

1. Free flying mode
2. Set 8'th channel to the 3'rd position switch.
3. Run the waypoint flight

How to stop the waypoint

1. Free flying mode
2. set 8'th channel to the 1'st position switch.

A storage waypoint remains until the deleting or unplugging.
it can restart it as the waypoint command in a completed it.
if the position hold,is hovering in place during the waypoint.
if change the free flight mode,run again the waypoint that was interrupted.

8'th channel should be assign the 3'rd position switch.

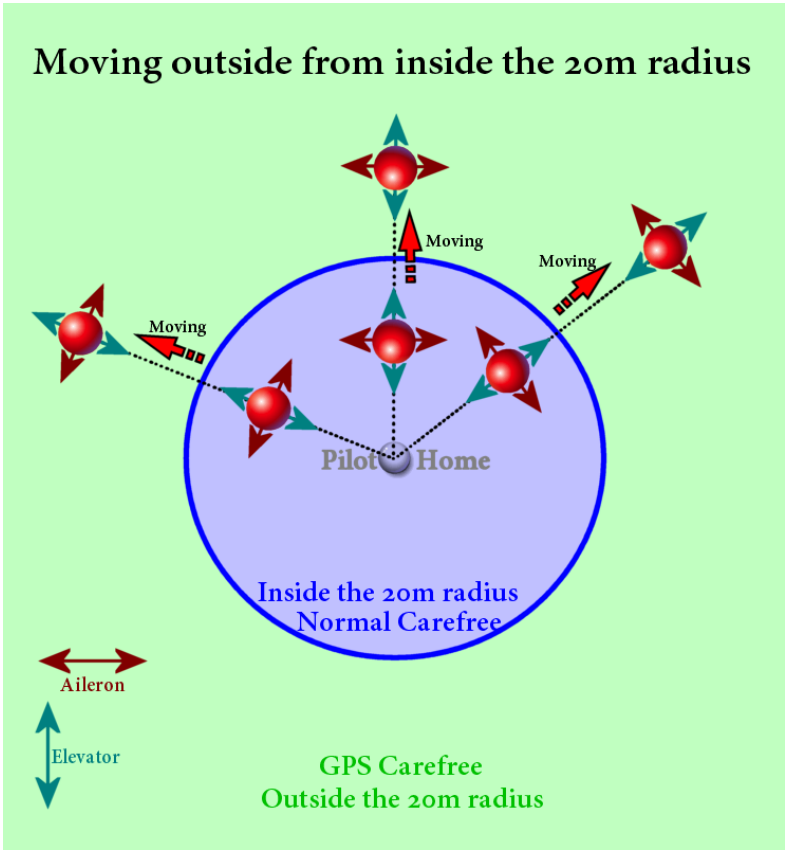
It is able to run the postion hold and comming home during the waypoint.

we recommend the waypoint with the multicopter that it has been finished the setting of the postion hold and comming
home.

GPS Follow Me function
Set the 8 channel to 3'rd position and must not have registered the waypoint is activated.
GPS position hold and coming home run first during the waypoint and follow me.
To use this feature, communications equipment such as X-bee,Bluetooth or MCFC,NaviBoard and GPS module is required.
How to connect the cammunication equipment, please refer to link below.

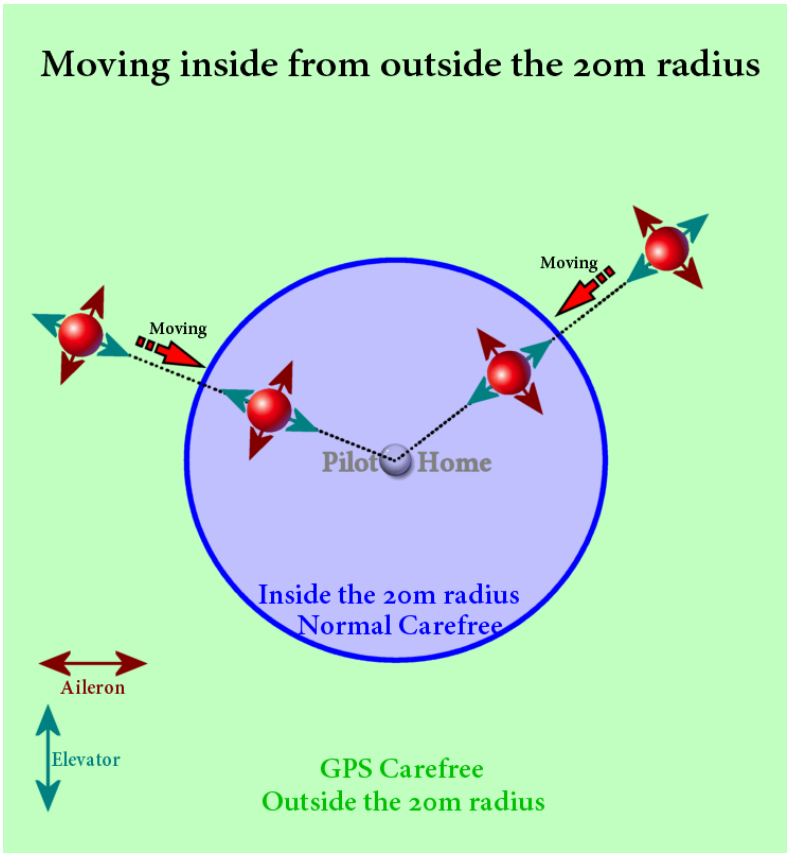
Carefree function
First of all,user who haven't read the post below, please read that
Introduction to general carefree
http://www.kkmulticopter.kr/index.html?modea=carefree
Introduction to GPS carefree
http://www.kkmulticopter.kr/index.html?modea=gps_carefree
To enable carefree, should be assigned to 3'rd position switch of 9th channel
1'st position(Off) is the free-flight mode (Carefree Off)
2'nd position(Middle) is carefree On mode
3'rd position(On) is waypoint or follow me mode
If this mode is not enabled, will be the function that the heading always toward to home during carefree.
In 2'nd position of 9th channel at v2.0 (Middle), the function that turn heading to home when coming home.
But, In v2.1, this feature deleted and replaced by carefree.
Within a radius of 20m based on home, carefree on
It must be enabled the function of carefree in the rear of the hovering.
It is operated general carefree within a radius of 20m.
Outside a radius of 20m based on home, carefree on
It can enable to do carefree function regardless of the position of multicopter and heading direction.
It is operated GPS carefree outside a radius of 20m.
A pilot have to control always thinking that the multicopter is being a rear of hovering even if heading is changed.
GPS Carefree function should be operated the GPS to work properly.
Carefree is enabled in a rear of hovering when GPS does not work and it is operated on general carefree mode.

In case deviate a radius of 20m



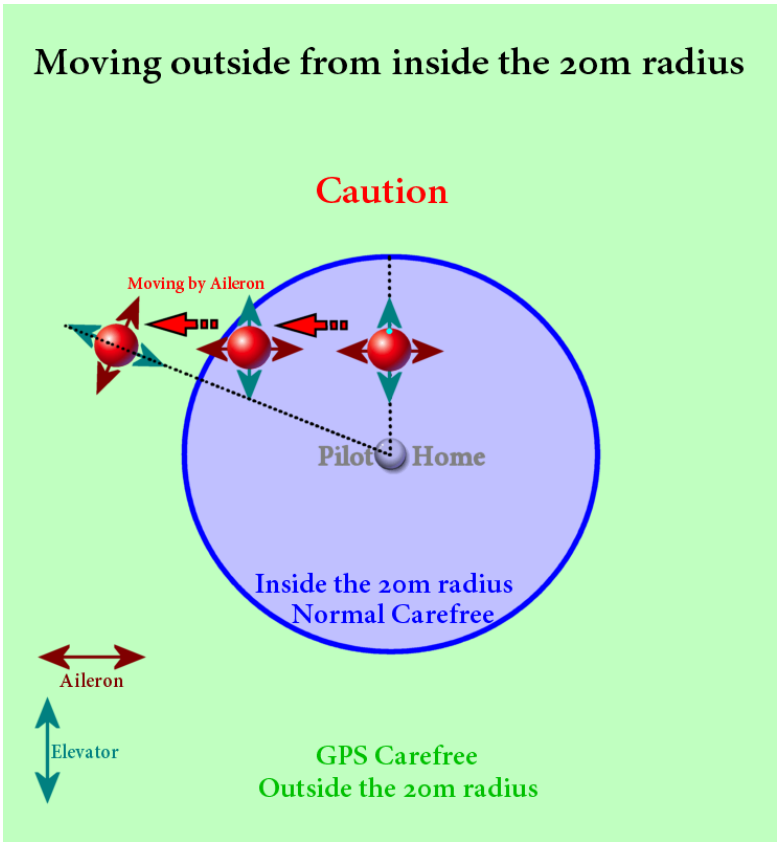
If outside a radius of 20m in using carefree within a radius of 20m, it is operated GPS carefree mode.
In general, deviate from a radius of 20m by using the elevator stick of the transmitter.

In case enter a radius of 20m



If enter a radius of 20m in using GPS carefree outside a radius of 20m, it is operated general carefree mode.
It is used the elevator stick of the transmitter to enter into a radius of 20m.

Caution detail in case deviate a radius of 20m

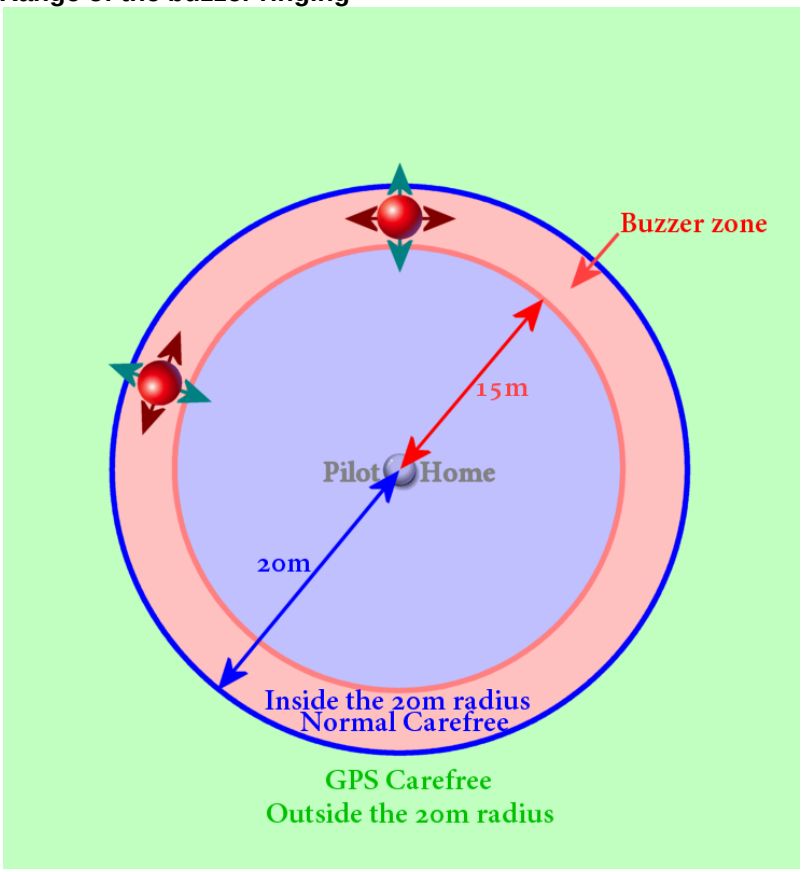


If outside a radius of 20m in using carefree within a radius of 20m, it is operated GPS carefree mode.
In general, deviate from a radius of 20m by using the elevator stick of the transmitter but must be caution to deviate deviate from a radius of 20m by using aileron.
This is because change the movement of multicopter by the movement of the stick at the moment when deviate from a radius of 20m.
When the buzzer rings, multicopter is being in a radius of range 15 ~ 20m radius from home in carefree function.

To summarize again,
1. within a radius of 20m
2. in using carefree
3. by using aileron
4. move out a radius of 20m

If are satisfied with four conditions above,please notice.
It has nothing to do the case move by the elevator.

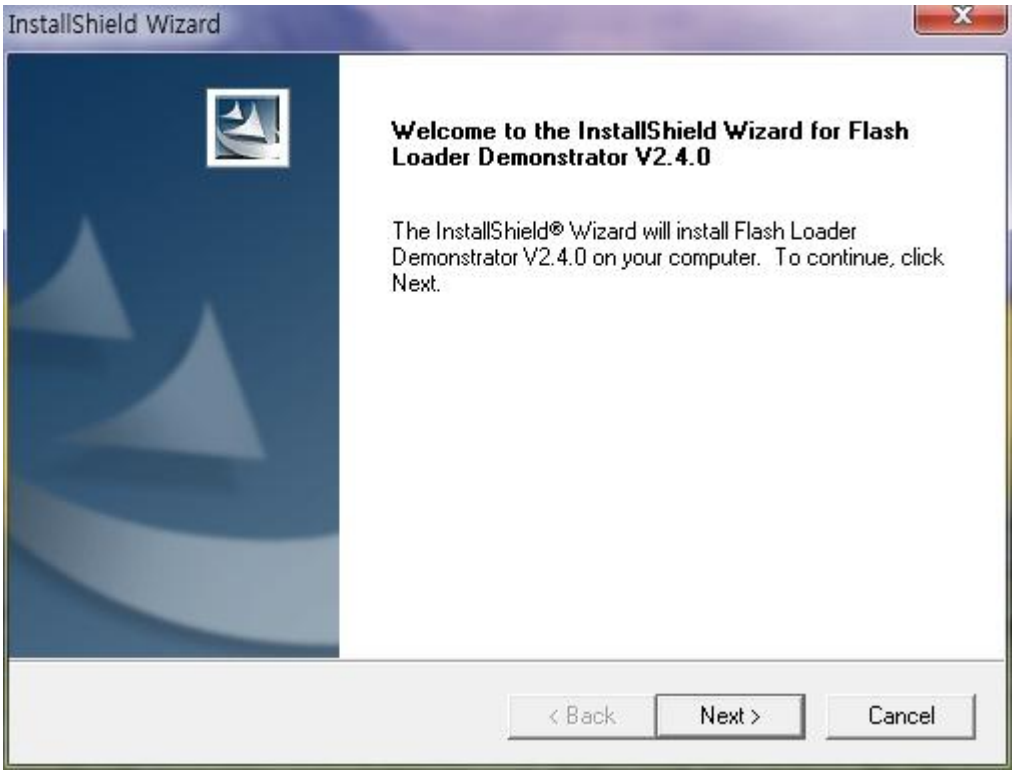
Range of the buzzer ringing

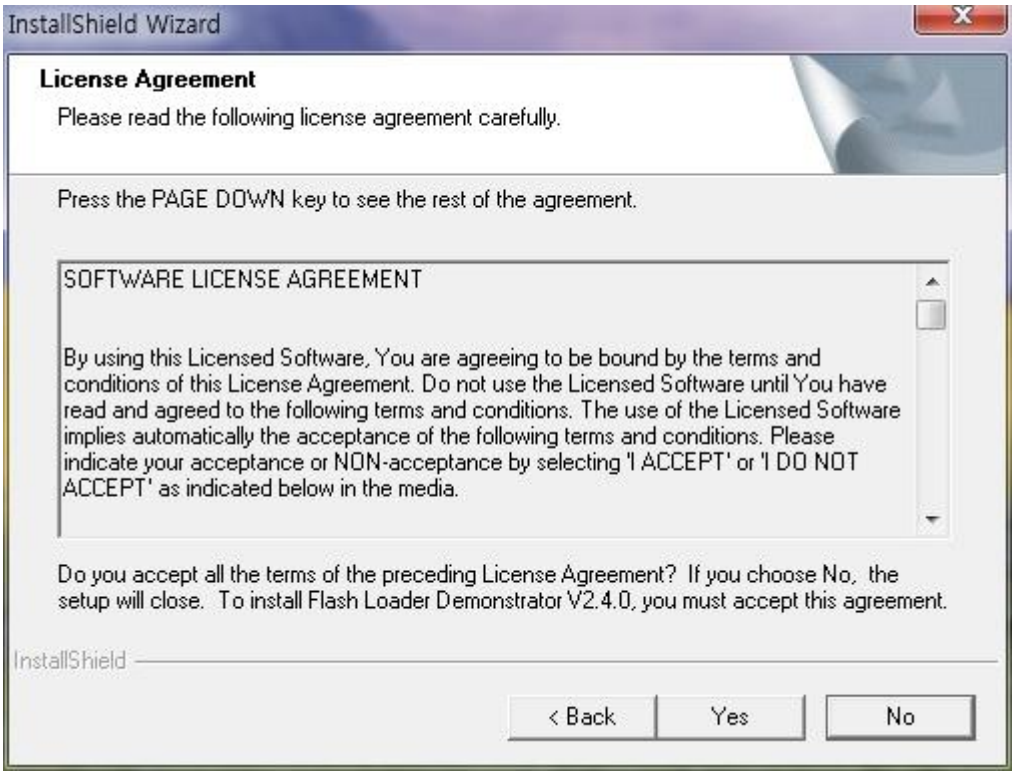


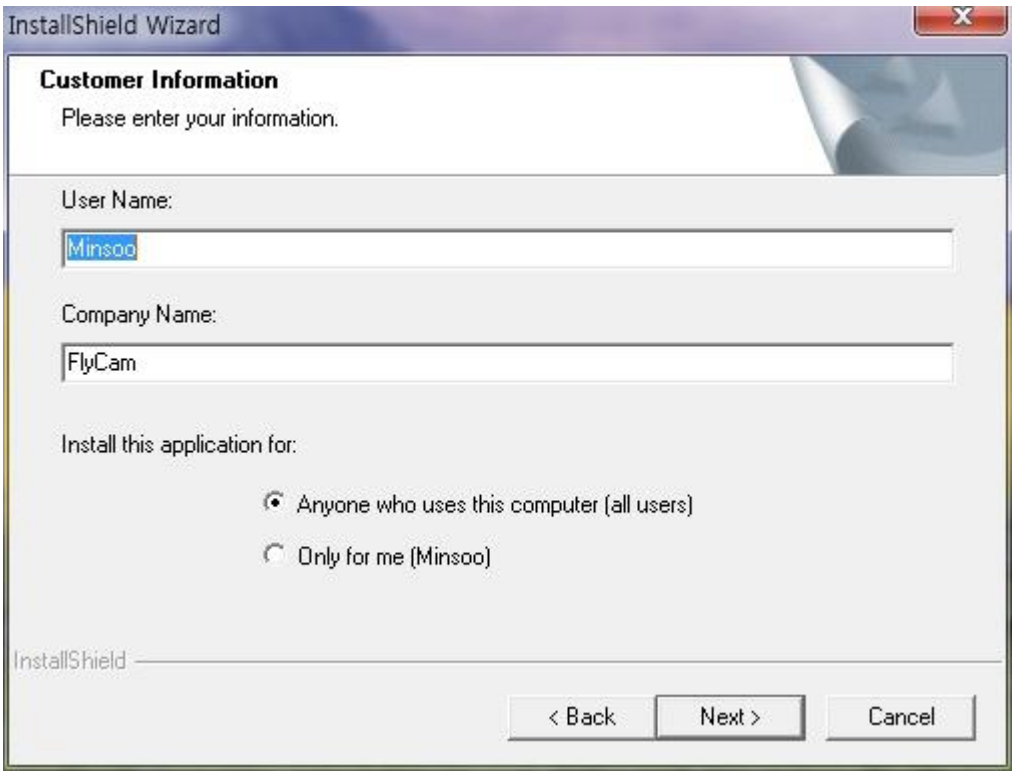
When the buzzer rings, multicopter is being in a radius of range 15 ~ 20m radius from home in carefree function.
In this range, it is operated general carefree and the buzzer will be not sound the case that move out a radius of 20m or enter into a radius of 15m.
Do not operate rudder by force in carefree mode.
For example, it is not able to control the situation that the multicopter is spinning by rudder control.

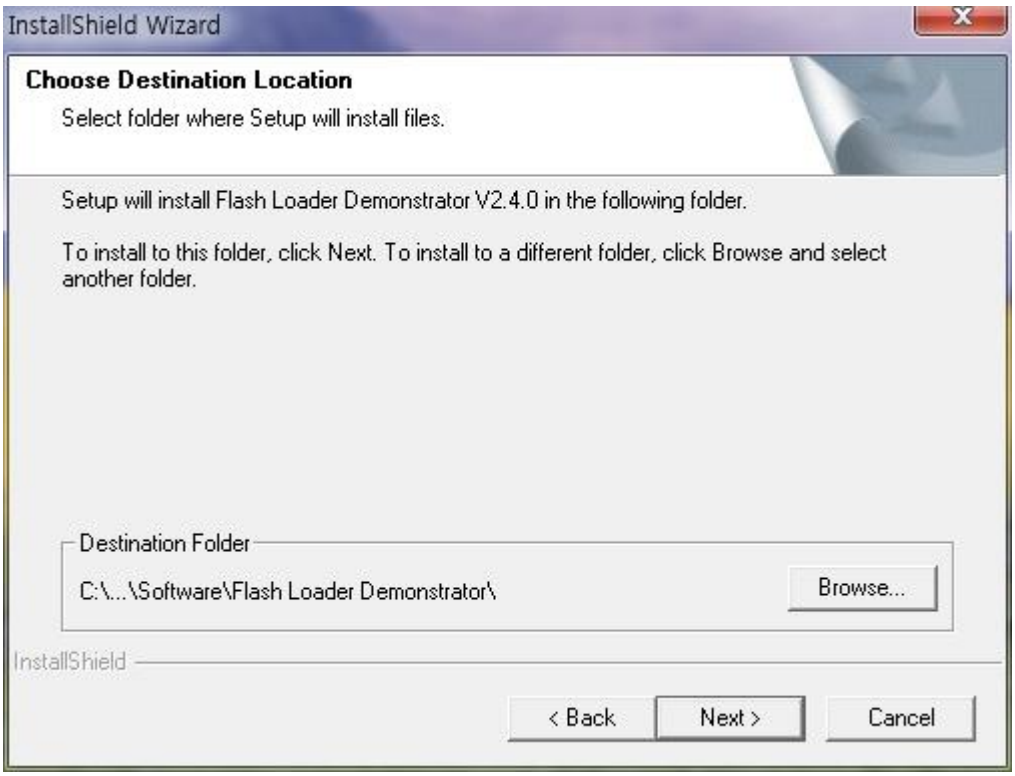
Firmware upgrade for the MCFC

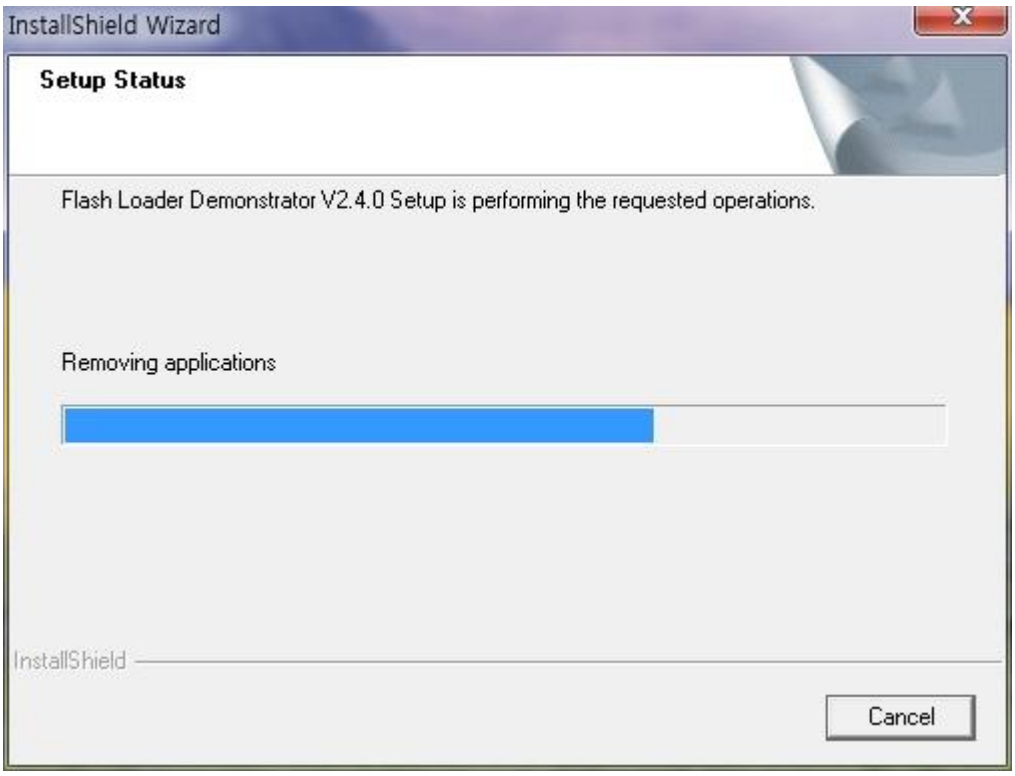
Please download and install as below.
Flash Loader Download
Run Flash_Loader_Demonstrator_v2.4.0_Setup.exe and install as below.

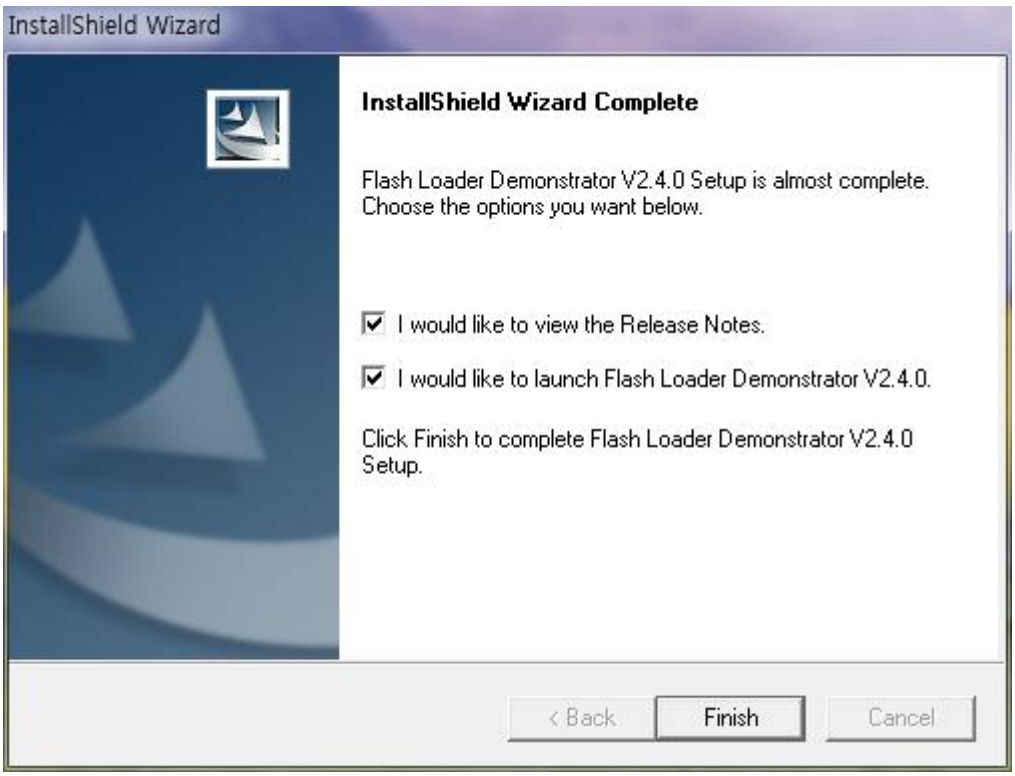





InstallShield Wizard
Customer Information
Please enter your information.
User Name:
Minsoo
Company Name:
FlyCam
Install this application for:
Anyone who uses this computer (all users)
Only for me (Minsoo)
InstallShield
< Back
Next >
Cancel


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install Flash Loader Demonstrator V2.4.0 in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\...\Software\Flash Loader Demonstrator\
Browse...
InstallShield
< Back
Next >
Cancel

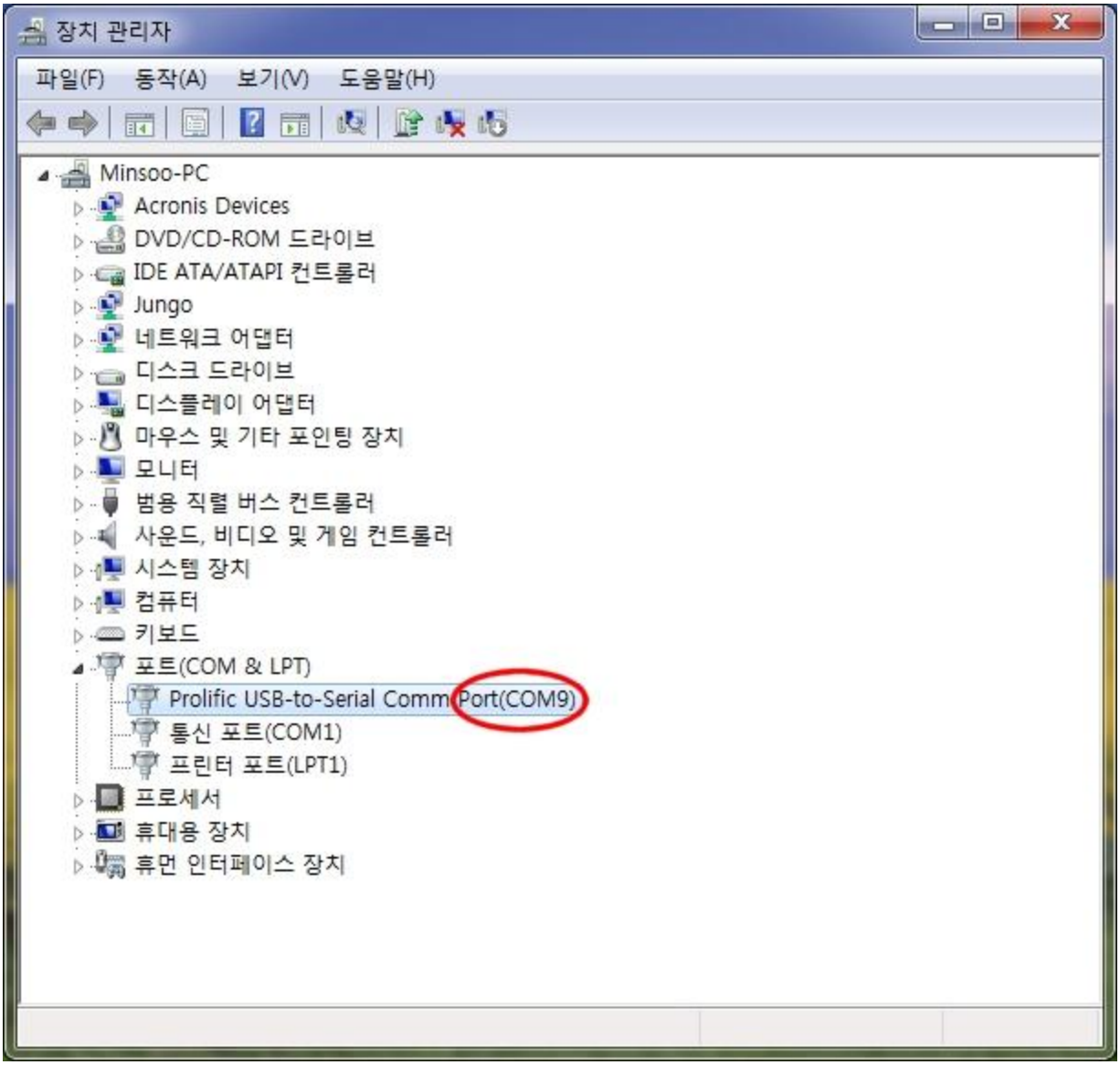




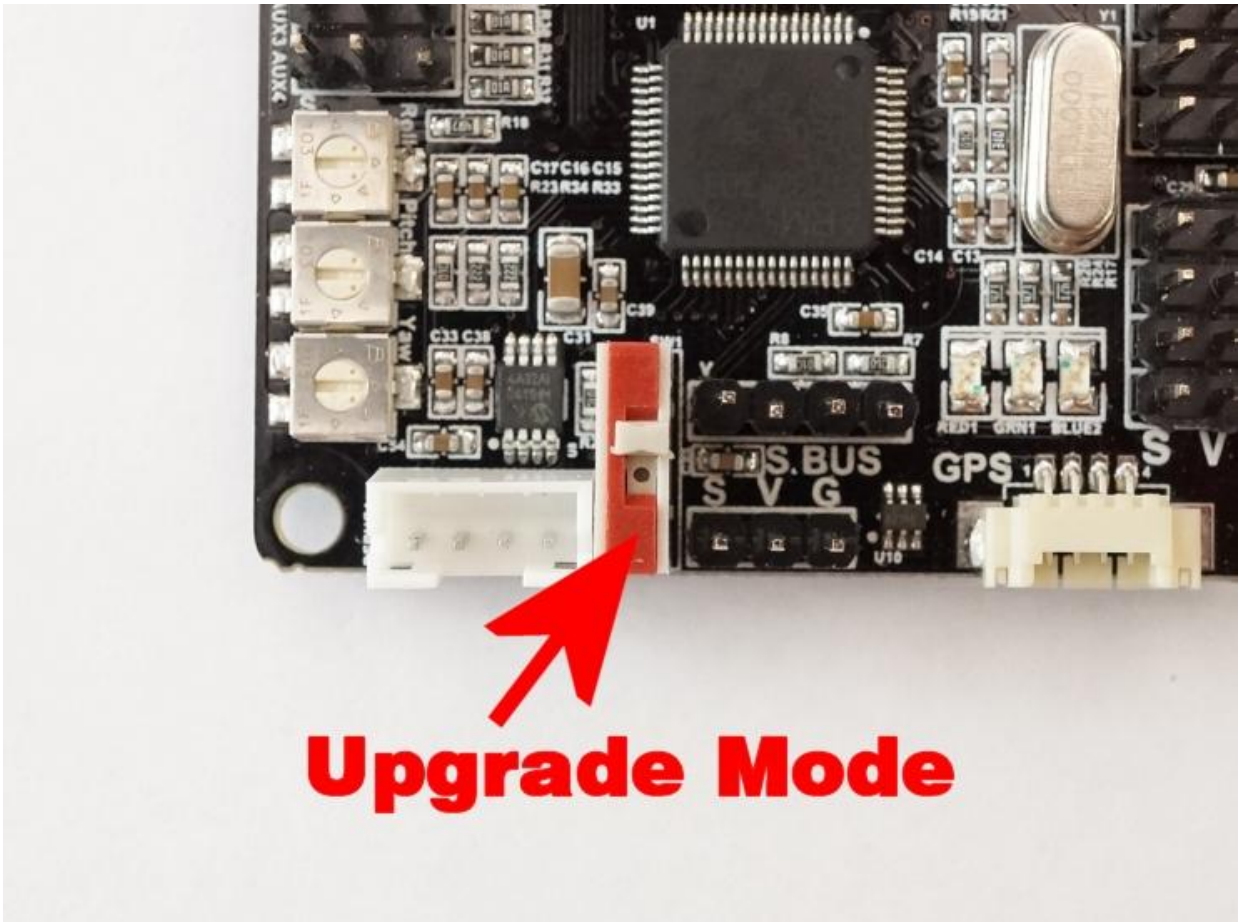
Installation finished.
Connect the FlyCam USB to Serial to USB port.
If the device unknown, download the driver from the link below.

Driver: PL2303_Prolific_DriverInstaller_v130.zip

Install and try again.
If using AVR ISP Programmer, it will assign a COM Port.If it does not work disconnect the USB Port and try again,
other wise assign a new COM port and try again.
Select “My computer” and Right click on it, go to “Properties” and select “Device Manager” plug the USB serial adaptor and the screen will refresh, look down the list of devices and find “Ports COM PLT” Left click on the tab to reveal the computer assigned Port.

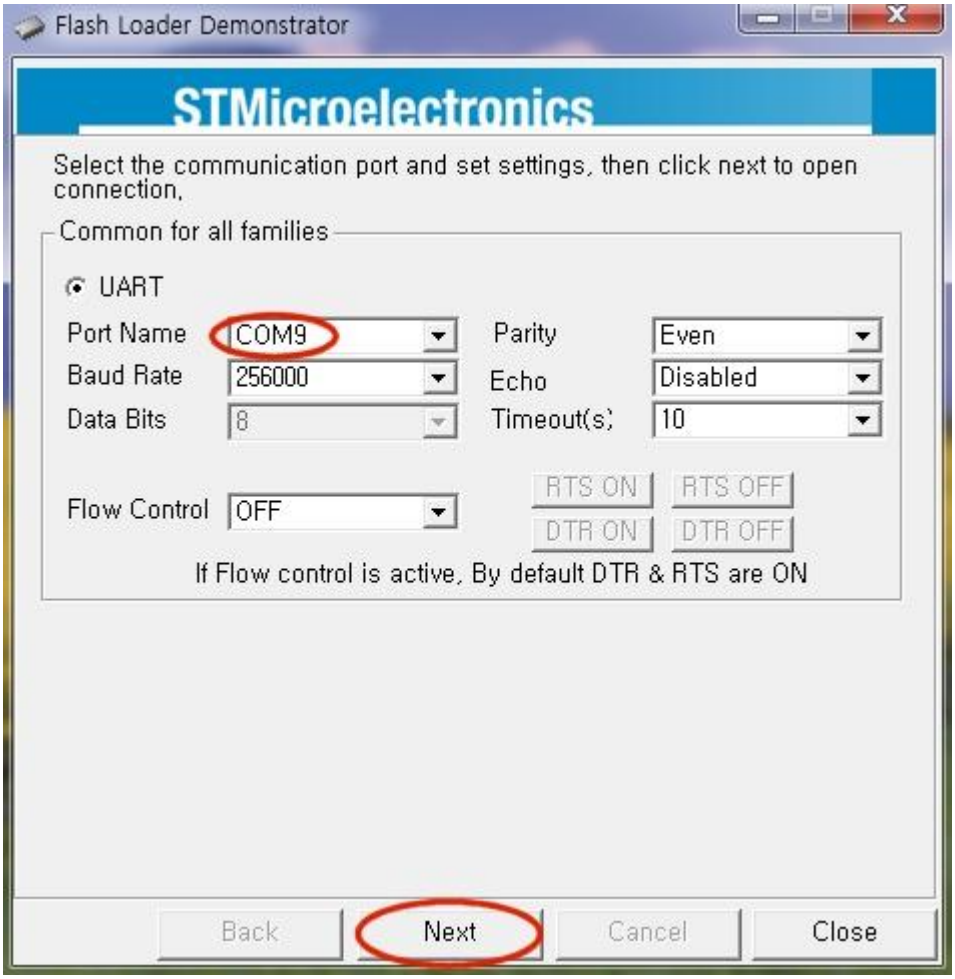


To upgrade the firmware, please change the switch to upgrade mode.
If you upgrade with battery power plugged in, it can be dangerous.

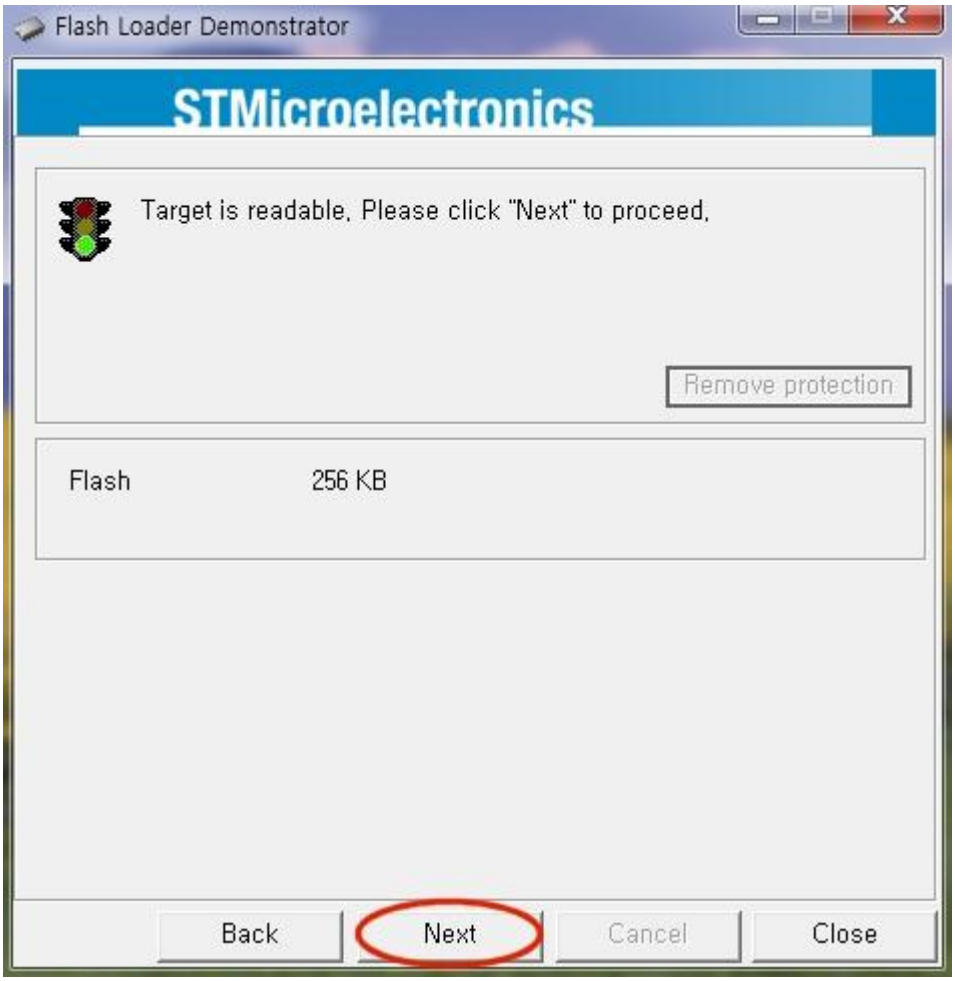


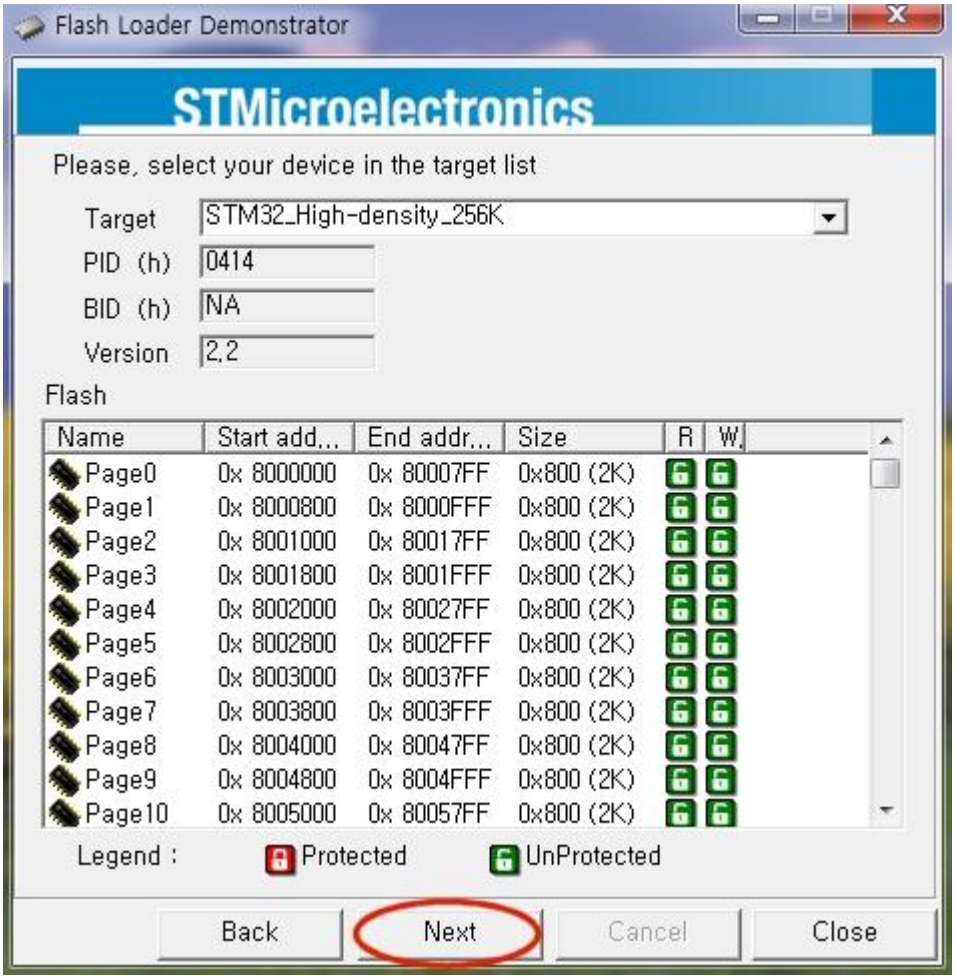
Connect USB to Serial cable to MCFC.

Run flash loader and select the computer assigned COM port from the drop down menu as shown below. Baud Rate set between115200 and 256000.

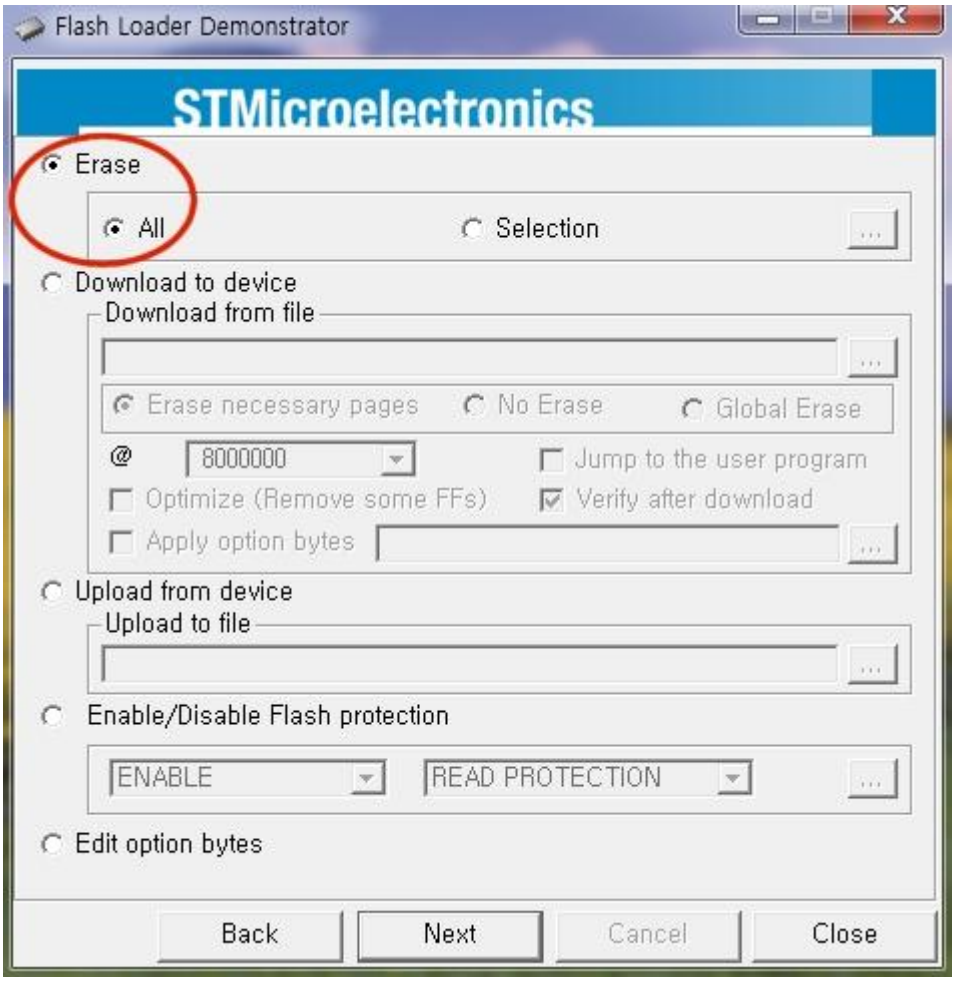


If you can not enter next step, please check com port assignment.
Reconnect FlyCam USB to Serial Cable.

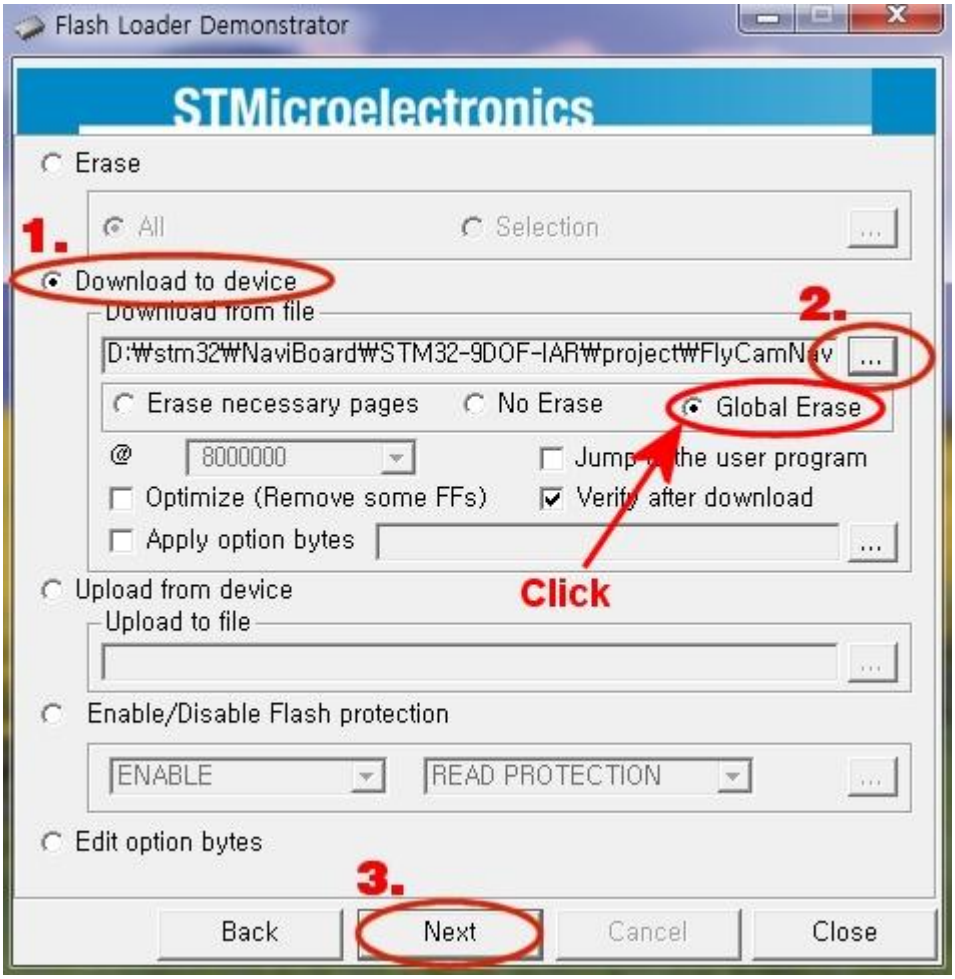




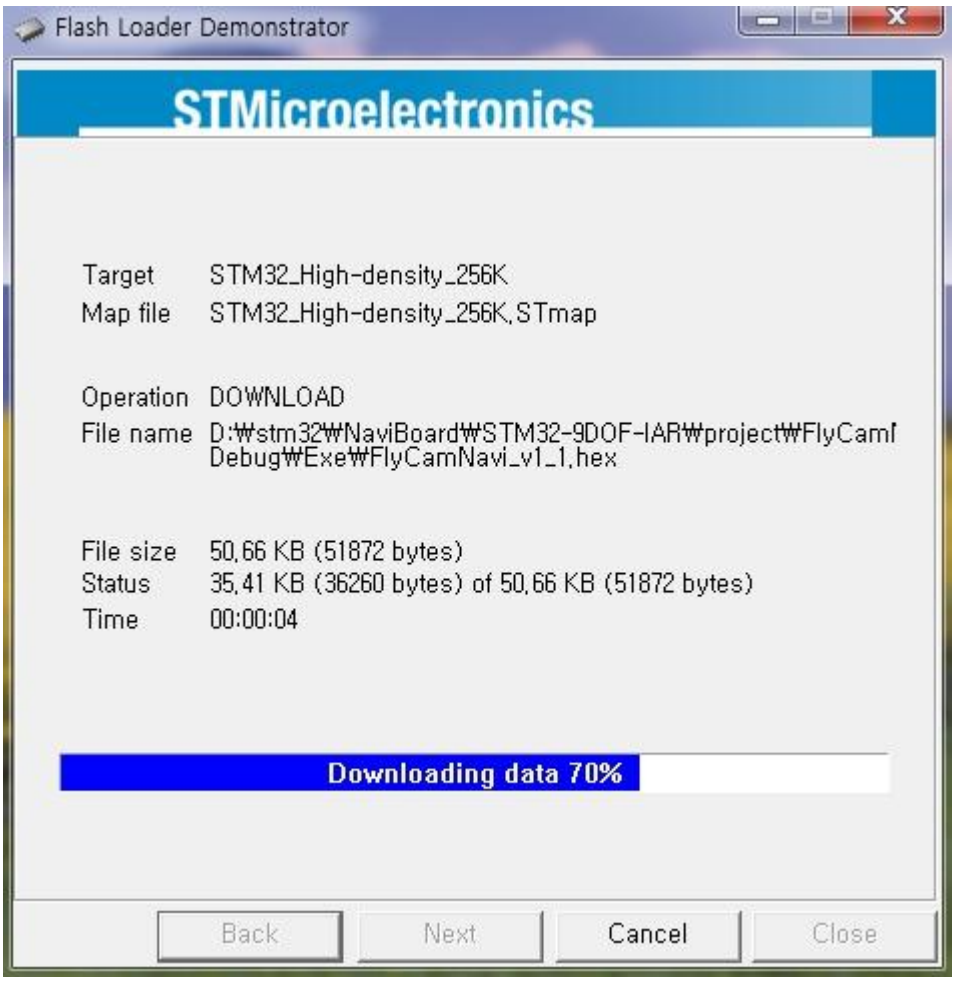
Select all.

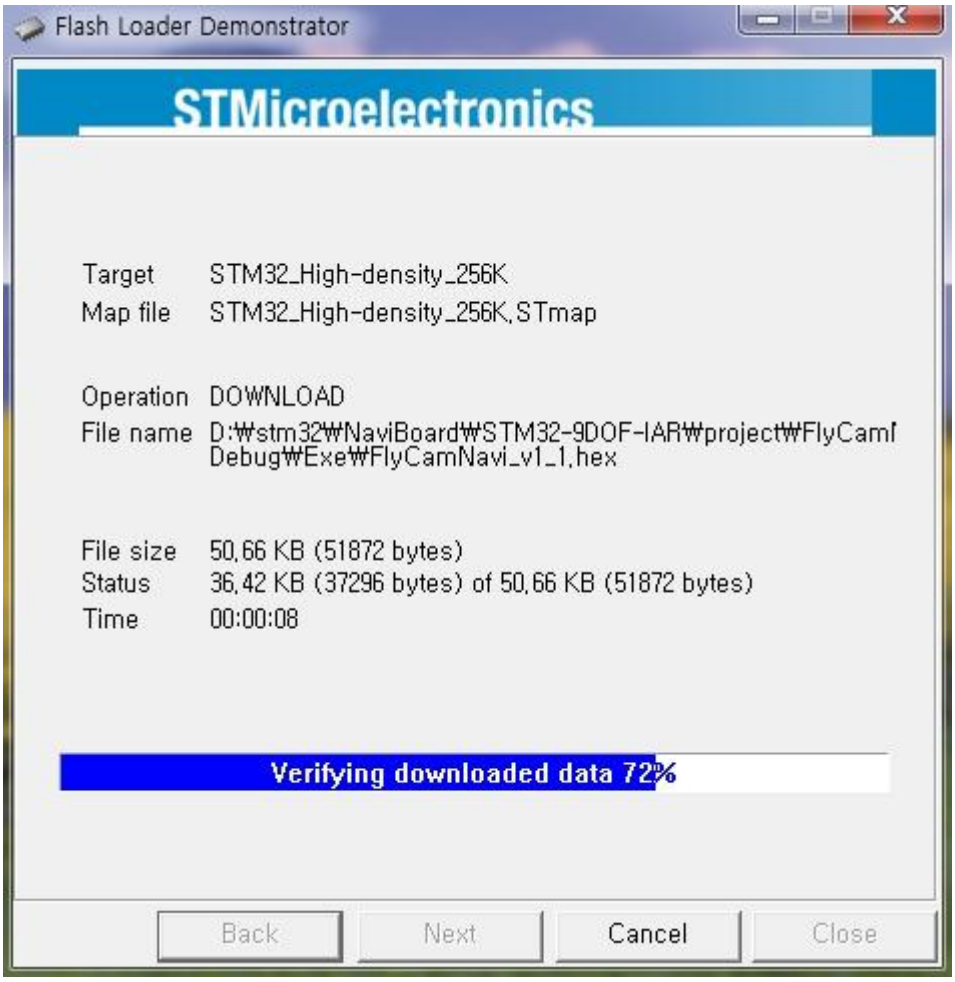


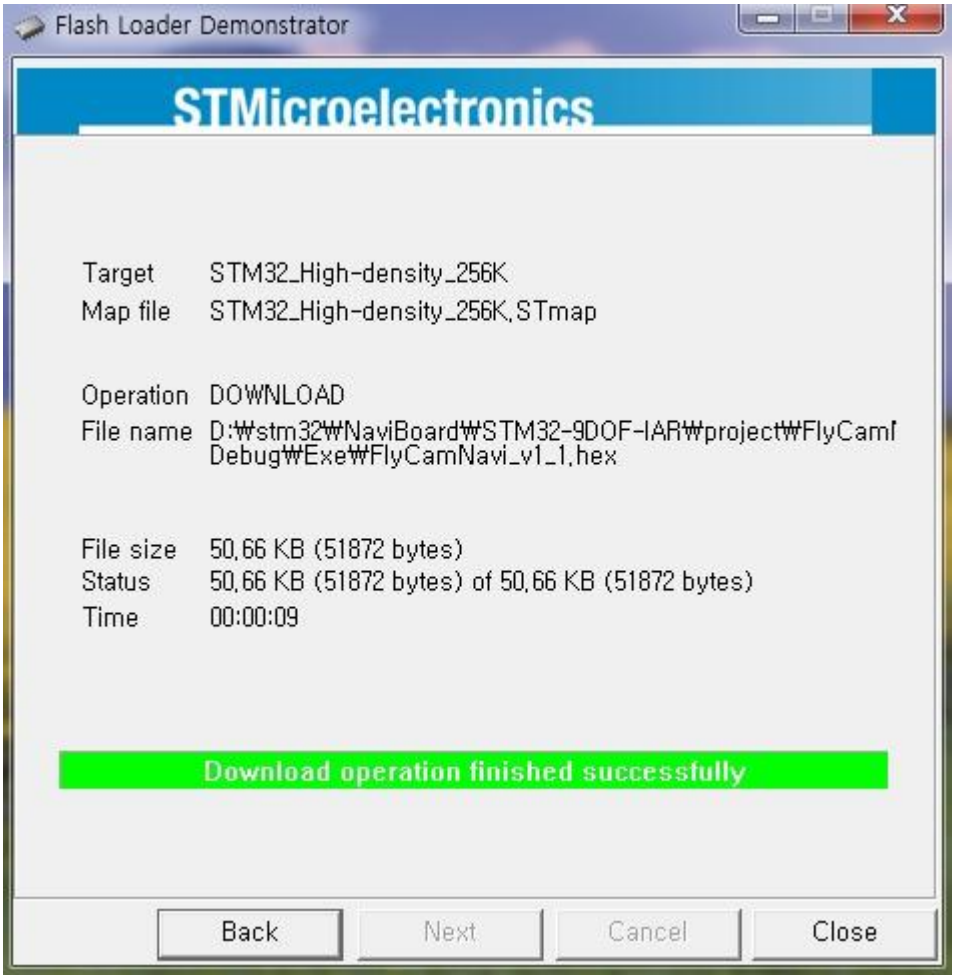
Select download file.



Select latest *.hex.
Latest firmware filename is FlyCamMCFC_v?.?
Download from link below.
http://www.kkmulticopter.kr
http://www.multicopter.kr


Flash Loader Demonstrator
STMicroelectronics
Target STM32_High-density_256K
Map file STM32_High-density_256K,STmap
Operation DOWNLOAD
File name D:₩stm32₩NaviBoard₩STM32-9DOF-IAR₩project₩FlyCam
Debug₩Exe₩FlyCamNavi_v1_1.hex
File size 50,66 KB (51872 bytes)
Status 35,41 KB (36260 bytes) of 50,66 KB (51872 bytes)
Time 00:00:04
Downloading data 70%
Back
Next
Cancel
Close


Flash Loader Demonstrator
STMicroelectronics
Target STM32_High-density_256K
Map file STM32_High-density_256K,STmap
Operation DOWNLOAD
File name D:₩stm32₩NaviBoard₩STM32-9DOF-IAR₩project₩FlyCam
Debug₩Exe₩FlyCamNavi_v1_1.hex
File size 50,66 KB (51872 bytes)
Status 36,42 KB (37296 bytes) of 50,66 KB (51872 bytes)
Time 00:00:08
Verifying downloaded data 72%
Back
Next
Cancel
Close



If you get an error, reconnect FlyCam USB to Serial Cable and Repeat the above step.
If successful, change the switch to the flying mode..