(Not so) Basic guide for the Aosenma CG035
Introduction and Foreword:

So, you have or are considering a CG035 and found the chinglish manual....lacking. You have questions and need answers. Welcome to a world of trials and tribulations called CG035 ownership. Congratulations.

First off, a word of caution, if you have not done so already I would NOT advise you to buy this as your first ever quadcopter, it has too many issues that can severely dampen your enthusiasm for the hobby if inexperienced. As a classification this could be regarded as a high end toy grade quadcopter verging onto the hobby grade in some regards. A smaller quadcopter should be used as a practice platform first.

I feel the need to issue my version of a disclaimer: This, my rendition of a reworked manual and everything contained herein, is my work (with the help and advice of others), based on my experience in the electronics and electrical engineering field, as well as my previous experience with RC vehicles, (though quad copters specifically are a relatively new field for me having only flown for a year or so at this time so I in no way consider myself an expert in the field), and is in no way affiliated with Ao Sen Ma. As such it should be taken as my opinion only and is in no way an official guide to the CG035 Quadcopter. Please be aware there may be errors contained in this document and it is constantly being updated as a ‘live’ document, constantly added to and revised to reflect new and changing issues and it should never be taken to be a finished product at any time. All advice contained in this document is just that, advice. Any modifications or procedures based on my advice which are carried out by you are done at your own risk!

I am providing this document in an attempt to help the community of CG035 owners and it is no way funded or produced in an attempt for renumeration.

Feel free to steal portions of this document and re work it if you like. Think that would satisfy a lawyer? Probably not, but is my way of absolving myself from the eventual backlash of someone doing something I have not foreseen based on this document, and also to say that it is freely available to everyone to use, copy and distribute.

If you have something to contribute and would like it added to this document please let me know via the Facebook cg035 page, linked below.

Thanks to all who have contributed so far (knowingly or otherwise ☝️) especially for some of the internal pictures taken from the group’s Facebook page! (Closed group, acceptance from admin required).

https://www.facebook.com/groups/Aosenmacg035/

I have included a link to a current (as of 20th February 2017) version of the ‘VAST’ software for changing the parameters of the CG035. CAUTION: I personally do not advocate it's use as it can brick your quad. However several people have had no issue any can happily use it. Not for Beginners. You have been warned.


Elio. (aka Alex Arcano, it's my old gamer tag from YouTube and it kinda stuck. ☝️)
**Initial setup:**
Before use charge all batteries and use 4 fresh, good quality AA type Alkaline batteries in the controller.

On the main charger for the cg035 battery there are 3 lights, they refer to each cell of the battery, the first 2 will initially be red and will change to green when the battery is fully charged. This may take some time. As much as 5 hours with the stock battery charger!

If you have the FPV model, then there is a USB charger which is used for both the monitor and camera. Conversely this starts as having no light on it and changes to red once fully charged. This usually takes about an hour for each, depending on your usb power supply. **NOTE:** before plugging the battery into the quad (which will switch the new model of CG035 on as there is no on/off switch) remove the foam pad covering the deans T connector on the battery and clean the area around it.

Before even thinking about flight of the CG035 check and double check all screws, most especially on the motors. Several have come with loose or even missing screws which hold the motors on, try to get into the habit of performing this before every flight.

Only do the first test of the motors and initial start up with the props taken OFF. Mine tried to take off for the moon when I first tried to idle the motors in manual mode. Fortunately I was holding it down at the time. I had to calibrate everything twice in order for it to work correctly.

Make sure when you are refitting the props that they are on in the correct position for the motors direction of rotation, the motors with the silver caps turn anti clockwise, the black clockwise and on the props the leading edge (highest edge when you hold it flat, highlighted in red) points in the direction of rotation. The factory props have a slight circular indent underneath around the hole to indicate the downward face and the blades are domed on top. Apparently someone got one a while ago with 3 Clockwise props fitted from factory and it did not go well at all.
Controller setup:

There are 4 LED’s across the bottom of the controller, these indicate (from left to right) GPS lock on the drone, GPS lock on the controller, drone out of range, and low battery warning. Once all lights are off this means the internal checks confirm ready to fly status.

Changing mode 1/2
If you want to change from mode two (the default left stick throttle) to mode one (right stick throttle):
Push both sticks to upper right corners and switch on the controller.
Release sticks.
Led above auto land/take off button should flash.
Move right stick to the right to have right hand throttle (mode 1), or to the left for left hand throttle (mode 2) Led should now be solid on.
Switch controller off.

To calibrate the controller:
Push both sticks to upper left corners and switch controller on.
The red LED above the auto take off/land button will now flash.
Release both sticks and then press the auto take off/land button once.
Move both sticks to full throw in all directions and allow them to return to centre position.
Press the auto take off/land button once again.
The led will now be solid red.
Switch controller off.
As simple as that.

**To calibrate the drone:**
Switch controller and drone on.
Flick SWB from position 1 to position 2 four times.
The rear white LED’s on the drone will come on.
On a flat level surface rotate the drone 6 times clockwise (mine seems to only need 3 rotations but the original manual says 6). The white led should now flash intermittently.
I then point the drone nose down and rotate it again, but the manual does not call for this.
Place again on a flat level surface
The white LED's should now not be on and it will be only the red, green and blue eye lights once more.
Switch everything off. Calibration now complete.

**GPS Lock:**
DO NOT try to fly at all for the first few minutes of the first flight, find a nice open space, switch the controller and drone on and put them both down, take a few steps away and don't touch them. The red lights on the controller should all go off on their own, especially if you are a few paces away, your body can partly block the gps signal and slow down a gps lock, have patience.

**Note:** Be gentle with it on the first flight, get used to the controls by doing simple manoeuvres such as short point to point take off and landings, slow banked turns etc. and try to resist the urge to go full throttle.
Flight controls:
For those new to the CG035 and the world of drone flight in particular there are listed below the instructions on the use of the controller as well as details of all the buttons and switches.

Mode 1 and Mode 2
It has been described earlier during the controller setup as having two modes and is by default in mode 2, the differences are outlined below (importantly!) with the CG035 facing in the same direction you are:

In both modes 1 and 2:
Left stick:
Left = rotate anticlockwise.
Right = rotate clockwise.

Right stick:
Left = slide left
Right = slide right.

In mode 1:
Right stick:
Forward = climb (throttle up).
Backwards = descend (throttle down).

Left stick:
Forward = away from you.
Backwards = closer to you.

In mode 2 (the most common and default for the cg035):
Right stick:
Forward = away from you.
Backwards = closer to you.

Left stick:
Forward = climb (throttle up).
Backwards = descend (throttle down).

Note: If you have the quad facing towards you then sliding and forward/reverse controls are inverted in relation to you, sliding to the left is accomplished by pushing right on the right stick, sliding right is moving the stick left. Moving forward is backwards and backwards is forwards!
To eliminate this you can use Headless Mode as outlined below.
Ready to fly:
This term will refer to the CG035 and controller being switched on with a full gps lock on both as outlined previously.

Starting and stopping the motors:
Note: Occasionally this can initiate a partial auto take off, (in either fully manual mode or GPS mode on mine anyway) so if the props are on make sure to only do this outdoors!
To do this you can, from ready to fly, pull both sticks down and in or down and out. This places the drone in an idle state with all motors rotating gently ready to take off manually by throttling up.
Once the drone is manually landed the motors can be stopped by simply holding the throttle down fully for a few seconds.
Alternately an emergency shut down of the motors can be accomplished by holding down and in/out on both sticks from ANY altitude. Note: do not use this unless it is a genuine emergency as doing it from any altitude causes the drone to drop like a rock. Smashing, swearing and tears will ensue.

Auto take off and landing button:
Self explanatory really, this is the big oval button in the centre of the controller below the power switch.
From ready to fly in GPS mode 3 presses of the button in rapid succession starts the motors spinning and launches it into the air to hover at a height of approximately 1.5 meters.
From any height during flight another 3 presses initiates auto land where it descends straight down from wherever it is hovering, lands and then shuts the motors off.

SWB:

SWB Position 1
Normal mode.
In this mode the quad will roughly maintain height if calibrated correctly and with no wind but nothing else, it will drift with the wind and be less stable in flight but will fly faster.

SWB position 2
GPS hold mode.
Using this mode it will hover in place and actively fight wind to maintain a static position. Used in combination with other functions outlined later.

**SWB position 3**
**Return To Home.**
In addition to landing if the RTH is used it flies back to the initial point of takeoff (slowly) then lands.

**SWA:**

**SWA Position 1**
Used for all normal flight modes, effectively this does nothing.

**SWA Position 2**
**Point of interest aka ‘circle mode’**.
Used in combination with the gps hold to circle a point of interest (POI).
A somewhat variable experience for most owners, this is usually used in combination with a camera, it is supposed to find a centre point to circle around until switched to another mode, with the radius of circle determined by moving the stick assigned to forwards and backwards to tighten or widen the circle.

**SWA Position 3**
**Headless mode.**
Used to ensure that forwards is always forwards, left is always left etc. in relation to the take off point. Useful if you are new to piloting and wish to get into the air without performing any manoeuvres like banked turns, whirlpools etc. or if using some camera techniques, for instance to maintain a moving subject in frame (without a 3d/4d camera gimbal with full controls, and no you’re not going to be getting that on the CG035), while the quad moves sideways.
**SWC:**

**The outer button (furthest right).**

*Binding. (Aka ‘Internal frequency’)*

Normally only used in the factory as this involves disassembling the quadcopter to access the binding button inside the chassis on the receiver/transmitter board there.

I have never personally had to do this but from reports it is accomplished by holding down the bind button inside the quadcopter then inserting the battery and then pressing the Binding button on the controller while switching it on. Procedure in troubleshooting later.

**The inner button.**

*Follow me mode.*

The drone is supposed to point towards and follow the controller with no guidance from you, however you can still alter its height and distance from you using the controls while in this mode. Again, you may experience ‘variable’ results with this such as it pointing in the wrong direction.

**SWD:**

These are both camera controls for use with the factory First Person View camera and alleged 'gimbal'.

**Inner button**

Starts and stops on board video recording, one press to start, a further press to stop.

**Outer button (furthest left)**

Takes a photo. You cannot take a photo while continuing to record video. If you press the photo button it immediately stops video recording.

**Gimbal control:**

This button is to the left of the Auto takeoff button, and is used to control the pitch and roll of the camera. Slowly, unreliably and overall, Badly.
Camera Switch:

This is to the right of the auto take off button. And thats about all I can tell you about it without completely reverse engineering the whole quad. Ok? Yes. Well..... Anyway your guess is as good as mine, no-one seems to know what this does and it appears to perform no discernible function.
Ok, you have charged the battery on the camera. There is one external switch on it controlling the power, it is either on, or off.

You can change the internal transmitter channel if you really want or have to by removing the 4 screws and taking the plate off the top; this gives access to the internal battery, wiring and a bank of 3 dip switches (circled in blue) giving the option of 8 different channels. No, I don't know which channels, but they can be found by using the monitor supplied with the FPV system for the terminally curious.
The gimbal is clipped onto the CG035 by a simple slide clip on it's belly. Electrically it is connected with 3 sets of wires plugged into the quad, their use outlined below.

Number 3 supplies power to and controls the roll remote function of the gimbal.  
Number 2 supplies power to and controls the pitch remote function of the gimbal.  
Number 1 controls the start/stop video control as well as taking picture control. Plugs number 1, 2 and 3 can be disconnected to disable any all of these functions.

Additionally as the fpv camera and transmitter has it's own battery and does not draw power from the quad it can function independently as a fixed FPV camera and transmitter if so desired.

There is a place to put the FPV antenna inside either landing strut, but nothing supplied to attach it with. I use electrical tape.
The FPV Monitor:

Simple in the extreme in operation. Screw the antenna into the available SMA socket on top before use. There is one slide switch on the right hand side to switch the power on. Up is on and down is off. The other button is on the front of the monitor, also at the right hand side, press this button once the monitor is switched on to start scanning all it's available channels to receive the the camera transmission. Range approx. 200 meters under good conditions.

Limited information is displayed on the top left corner of the screen:

Here you can see the current channel and it’s associated frequency.
The current signal strength.
And finally the approximate voltage and % remaining in the battery of the monitor.

Note: the percentage displayed is always incorrect, the maximum I have been able to see is 75%.
Some other items and procedures that I would recommend:

Try all the functions as soon as you can (probably during the second flight after you are familiar with the normal flight controls) to be sure they work. As I think most will agree, this little bird has more than it's fair share of issues. The quicker you identify any minor problems, the quicker it can (hopefully) be fixed before causing any major problems. Like crashing.

As soon as the low voltage alarm comes on, bring it back and land, no point in running the battery into the ground as this can shorten it's lifespan.

Do a post flight check on all major components to make sure nothing has come loose or damaged as soon as possible.

Check should include:

**Chassis screws and motor screws.** These literally hold the quad together and hold the motors in place, they can work loose from the in flight vibrations. Tighten as necessary.

**Motors.** If they are excessively hot after immediately after landing this may be an early symptom of a defective motor. If this happens refer to troubleshooting section for help in diagnosis.

**Propellers.** Check for nicks and cracks in the blades, especially after hard landings or even seemingly gentle tip-overs. Any damaged props should be immediately replaced. Check the prop nuts as well, these should actually get tighter with use but are worth checking too.

**Battery.** Check for excessive heat and swelling of the main battery, this will indicate a battery with potentially dangerous issues and should be replaced as soon as possible. Check battery voltage and balance if you can, excessively low voltage or imbalanced cells can be another indication of a battery about to fail. If you have the FPV version do the same for the camera/transmitter battery built into the gimbal. Wait before recharging the LiPo battery, it will be quite warm (but not hot) after flight and it needs to cool before charging it up again, this will further extend the life of the battery.

**Chassis.** Inspect the actual chassis of the quad for any signs of damage. Remember that this is the body of the quadcopter and that it has no reinforcing internal structure or 'skeleton' and any cracks, chips or excessive flex can be a weak point that could potentially fail in mid-flight.

Your second flight will be perhaps even more telling, if you are used to the controls, push it a bit further and faster, try straining the motors a bit, do a full throttle 'punch' straight up and note any odd noises, rattles or erratic behaviour as this may indicate a screw loose or badly imbalanced prop. If all seems fine then start to play with it more, let it stretch its legs so to speak, do full speed passes or take it higher, whatever you feel comfortable with to your skill level.
Again, once LVA comes on bring it back and land. My LVA only gives 1 minute of hover before it tries to auto land, and again as soon as you can, do a full post flight check to make sure everything is in order, if nothing has gone wrong by now you are probably all good to go and use it however you want with less fear of it either trying to eat its self or actively try to kill you.

Further purchases

A basic list of additional spares, further equipment and tools you may wish to consider purchasing for use with quadcopters in general and especially if you intend to continue with the hobby, maintain, modify, or upgrade the CG035.
Spare propellors (6045 type as standard not 5045 as is quoted in manufacturer’s manual).
Spare landing gear.
Spare batteries.
Spare motor caps/prop nuts.
Spare Electronic Speed Controllers (a particularly soft point on the cg035).
TF (aka micro sd) card, class 10 for HD recording.
Better balance charger to more precisely and quickly charge the LiPo(s)
Cellmeter and battery tester for quick testing of all batteries.
Multimeter for troubleshooting and diagnostics.
Needle nose pliers.
Precision screwdrivers.
Precision Tweezers.
Side cutting snips.
Soldering iron (low or variable wattage electronics and not a heavy duty or ‘gun’ type), with solder, sponge etc. to go with it.

Most of the above could be considered basic essentials for running repairs, faultfinding and minor upgrades for the CG035.

Hope this helps!
**Trouble Shooting**

This section assumes you have at least a passing familiarity with electronics, though I have tried to simplify things wherever possible to open the process to as many as I can.

OK. Time for some fun and games.
Let’s start with something simple.

**List of tools you will need.**
As listed above in ‘further purchases’ these now become more or less indispensable.
Screwdriver set, long reach, thin precision type.
Multimeter, (and for convenience a cell meter) preferably with audible continuity test.
Soldering iron, (lower powered electronics or variable temperature type) solder, soldering sponge.
Desoldering tool.
Snips.
Needle nose pliers.
Cordless drill or drill of some sort with variable speed control (you’ll find out in a bit).

**DOA**
You have inserted the battery into the quad and nothing happens, no lights, no noise.
Completely Dead On Arrival.
A few things can cause this issue.

Best case scenario is that you have forgotten to remove the foam protective pad over the Deans T connector.

If this is the case then simply remove the pad to make it look as shown.

However, if you have forced it in then there then you may need to clean the contacts of the battery and inside the quad to ensure a good connection. There may be pieces of the pad or residue of glue that needs removed. Try using tweezers to remove the debris and **lightly** scratch the surfaces to take them back to bare metal.

Another option is the LiPo battery has failed, either by physical damage or through being drained far past normal levels. Generally speaking this is fatal for the battery and it will need replaced.
Test this with a cell meter as shown or a multimeter set to the 0-20 Volts DC range, (all measurements from here on out will be done using this range and setting unless otherwise stated) measured across the Deans T connector. The stock battery is a 2 cell (2s) 7.4 Volt with an alleged 3200mAh capacity, though in practice it is usually nearer 2800mAh or less. A functioning and fully charged battery is around 8.4V, 4.2V per cell (each cell should have near identical voltages). If it is dramatically low, like 5V total across the T connector then it is a good indication that the battery may be dead and needs replaced, though it may be recoverable with a good quality balance charger. A cell meter as shown above offers the information in a simpler way, just connect it to the balance charging port and it shows the voltage of each cell and the total of all cells. Another possibility is.....

**The charger**

Could have failed and is only charging one cell or not at all. Measure the output of the balance ports on the charger while it is switched on. Be careful not to short out the contacts with the meters probes while doing this.

The voltage on a correctly functioning stock charger (with no load) is measured as 4.8Volts across each cell. Pin 3 is ground (or – terminal, furthest right). Pin 2 is cell 1, pin 1 is cell 2. So if you put the negative probe of the multimeter on the negative pin of the charger and the positive probe of the meter on pin 2, you get a reading of 4.8V. Now move the positive probe to pin 1 and this gives you a cumulative value of 9.6V, 4.8V per cell, if you move the negative probe to pin 2 this shows you the value for cell 2, which again should be 4.8V.

If you do not get quite near these values, the charger is probably broken and will need replaced.
If the battery and charger check out as ok then the issue is within the drone, look inside the battery bay and if you can see a damaged Deans T connector then that is probably the issue.

If looking inside the battery bay you see nothing untoward then you may wish to open the chassis of the quad for further inspection.

Another possibility is the red and/or black power wires are not soldered correctly onto the main board, or at the back of the T plug, check this for faults too. If everything is ok it should look as pictured here.

If none of these are the issue then the quad is more than likely dead and will need a new main flight board. Major surgery involved.
**Constant beeping from the controller.**

**Low voltage indication**

The right most led on the controller is flashing and the quad refuses to move. In this situation the lights may flash on the quad for a time and even the start up tones may sound though it goes no further.

Again a couple of potential issues here. The battery or charger may be damaged and not charging correctly, though still have enough charge to partly power the quad giving rise to the above condition. Test the battery and charger as outlined in the above DOA section. Another possibility is a faulty voltage sensor within the quad or even the voltage reading not being transmitted correctly back to the controller. Unfortunately if it is either of these it is likely to be a fault in the main board and the only solution I know of is replacing the whole board.

Though unlikely another possibility is a fault in the controller in it’s communication with the quad. As a last resort you could attempt to re-bind the quad and controller as outlined further on.

**Gps failure/out of range warning**

Also the third light on the controller is flashing. This indicates the controller thinks the quad has had GPS failure (out of range warning), due to not receiving any GPS data. Check the quad and make sure there is a green light on under the GPS dome of the quad, if not then this is a known and common fault. There are a couple of possibilities for this problem, faulty wiring leading to the gps unit or a faulty gps unit it’s self are the most probable causes.

Test all the wiring going to the gps pod for continuity and a good solid solder connection. Back out with the multimeter, this time set for audible continuity test. If you do not have this on your meter then set it to resistance. All continuity readings should read as 0 Ohms resistance. Test from one end of the wire to the other with the GPS unit disconnected from the quad. If the wires and solder joints all check out as ok then the GPS unit will need replaced as further fault finding on it is near impossible at home.
Controller has became unbound from the quadcopter

An all too common problem, this is annoying as hell to fix because it is so simple yet complicated at the same time. You will know if this is an issue as the quad will accept no input from the controller at all and the red LED above the auto take off button will be flashing.

To fix this you need to disassemble the chassis by taking out all 22(!) screws and removing the props in order to access the bind button on the quadcopter.

The procedure to bind is as follows:

Hold the bind button(circled in blue, above) down while inserting the battery on the drone, the led next to the button will now flash. Release the button.

Next hold down the ‘internal frequency’ aka ‘bind’ button (circled in blue, across) on the controller then switching it on. The led next to the bind button inside the drone is now solid red, as will be the red led above the auto take off/landing button.

Simple.

Job done and ready to fly, once you reassemble, screw all 22 screws back in and put the props back on that is.
**Motor is not turning, or is erratic**

Again, a few options here and several test options: Calibration needed, Faulty wiring, faulty Electronic Speed Controller, faulty motor or faulty main flight board. The flight board is the least probable cause of the problem unless all motors are affected. Thankfully. Remember to label or take a picture of all the positions of each wire and component you remove, this will help during reassembly! If you feel confident of a solution or have spare parts to hand then feel free to read on but skip ahead to sixth or even seventh test.

**First test**
At this time check the motor to see if it is loose or rattles, it may be missing a screw or two or they may just be loose. Try turning the motor by hand and listen for any noise, they should be virtually silent, if there is noise this could indicate a mechanical failure or foreign object inside the motor which has probably caused damage (you can try removing the foreign object if possible and running the motor again to see if this helps).

Try recalibrating the controller and quad gyros before looking for another source of the failure, simply because it the easiest and least invasive solution, though not the most likely one, unfortunately. In all probability though you may need to replace the motor or Electronic Speed Controller.

**Second test**
Next would be opening the chassis and carrying out an inspection of the wiring to the ESC and motor to see if there is a break there. A broken wire or intermittent connection can lead to false or incomplete signals to the ESC or motor giving erratic control and flight. Have a look at the esc for signs of burning or bubbling of the components which may indicate overheating. If the wiring and ESC looks good then the problem probably lies within the esc or even motor. There is no really simple home test for these parts other than to swap them with a known good one to see if this solves the issue. However if you feel able to then there are further tests to see what has failed.

**Third test**

![Image of a motor or electronic component](image-url)
You can desolder the motor from the ESC and test each phase (wire windings inside the motor) in turn to see if they have a short to the stator (the bit of the motor that the wires come out of which stays stationary when on the quad) to determine if there is a short circuit. There should never be one. If a motor spins freely at all then it will probably be good, a brushless motor is usually a remarkably robust piece of technology but it is still prone to poor workmanship, abuse and overloading, so it is still worth testing.

**Fourth test**
To proceed further you need to remove the motor from the chassis (4 screws holding it in underneath). Then unscrew the screws holding in the Electronic Speed Controller, the little circuit board in the picture above. Once this is done you need to desolder the motor from the esc if not already done, completely removing it from the quad.
Take the motor and put the screw end (rotor shaft) in the chuck of the drill and while holding the end of the motor that the wires come out of so that it should stay stationary, run it up to speed for a couple of minutes making sure the wires do not connect to each other, isolate with a little white electrical tape and labelling them A, B, C. What you are looking for here are two things, sound and heat, the motor should be more or less silent, just a gentle whirring noise or whistle with virtually no heat as it is not under load. If there is either of these it’s usually a mechanically dead motor and needs replaced.

**Fifth test**
While still on the drill, again spin it up to full speed then use your multimeter on the (highest range first if not an autoranging meter then work your way down the ranges until you see a reading) VAC setting, test the voltage output across each phase in turn. To do this keep the three wires isolated from each other labeled A, B, C. Connect the meter to the bare wires of A and B. Take note of the AC voltage. Then repeat this test on wires labeled B and C then wires labeled A and C. All three readings should be pretty much the same, providing your drill is running at the same speed on all tests. If not, then dead motor. Needs replaced.

**Sixth test, no multimeter (optional)**
If you do not have access to a multimeter (I strongly suggest buying one) then you can try swapping out the motor for the diagonally opposite one. E.g. Clockwise for clockwise motor to see if this works. This means desoldering and soldering the good motor back where the suspected bad one was. This way if you have to buy and fit a new motor you do not have to do this process twice. Spin the motors up to idle and see if there is any change.

**Please note:**
Every time you desolder from a PCB (Printed Circuit Board) you run the risk of delaminating or lifting the copper circuit, this should only be attempted a limited number of times as it will, eventually, destroy the board, also this has to be done using the like-for-like motors as they are designed to run in one direction only.

**Seventh test.**
So the more probable cause is with the ESC, this is a much more fragile part. Unfortunately there is no real home test for this other than a visual inspection for charring caused by overload (just compare it to a known good one, it should be identical) checking for poor solder joints or just swapping it out, it is just that complicated. If you want to do
this test you can swap if out with the diagonally positioned motor and working ESC assembly to see if it will function with another set in this position. If this does not isolate the issue then this would determine that the main flight board is the problem meaning it will need replaced. Not very expensive, all things considered, but a long, tedious and involved process.

**Note:**

Be careful if you need to order a replacement esc or motor (so far there seem to be two distinct versions of the esc and motor) as they should all match ratings and values otherwise there can be balancing and other issues when you install a new but unmatched one.
Camera/Gimbal/FPV Transmitter unit

Ok, is this actually worth mentioning?

Right.... I suppose a few words of warning...?
It is a diabolical contrivance and should be sentenced to death by fire. The tiny servo’s almost universally fail after a few flights, they never stay where they are pointed, the video quality is middling at best, especially as it is claimed to be 1080p and there are charging issues where the internal battery fails or has a poor connection.
It needs re designed from the ground up to be even half way capable.

If it breaks down enough to make it unusable, remove it and replace with another system such as an action cam and mount if you want fairly good quality video recording (as shown above) and even with a connected FPV transmitter if you want or just replace with an all in one type of FPV camera/transmitter which can run from the gimbal power out.
If there are no lights on the camera/transmitter (usually one red and one blue) this usually indicates the battery has either failed or is not charging correctly via the USB charger which should output 5.2V when plugged into a suitable power supply. If not, this needs replaced with a lipo USB charger, not just a straight through power supply from a USB cable as it needs a dedicated charger to sense the voltage in the battery in order to cut off supply to it. You could then use this opportunity to replace the internal battery, if desired, with an external single cell one that you can remove to charge and wire on a JST or connector (or one of choice) to power up the camera and its transmitter. Longer life if higher capacity as the one inside is only 250mAh and it would probably be a bit more reliable! If it is still partially working (normally because of a melted servo) just disable the pitch and/or roll functions by pulling out plug 2 and 3 respectively from the quad and use it simply as a FPV camera.

Fpv monitor

Not switching on.

As with the camera this may be indicative of a failed USB charger, test it with your meter, it should output around 5.2V when plugged into a suitable USB power supply. If not, this needs replaced with a lipo charger, not just a straight through power supply from a USB cable as it needs a dedicated charger to sense the voltage in the battery in order to cut off supply to it. Everything is internal from here so opening the monitor is a must. Fortunately there are only 4 screws holding the back on. Inside you will find the small LiPo battery as well as access to everything else for that matter. Again, test the voltage of battery, if not approximately 4.2 Volts when fully charged then it has probably failed and may need replaced.
**Weak or ‘snowy’ picture at close (10meter or so) range**

Usually indicative of a faulty antenna, sma connector or transmitter. An internally broken antenna can be annoying as it is essentially unfixable, having to buy a new one is the only realistic solution, however a couple of basic tests can usually determine where the fault lies.

Remove the antenna and see if this affects the reception, if not then this means it is on the receiver end, continuity test across the middle pin and outer ring where it screws onto the monitor. If there is a short here, the antenna is faulty and should be replaced. However a further test can confirm if it is the antenna or if the monitor has an internal issue with it’s sma socket. Simple if you have a spare antenna, swap it out and if it fixes the issue, problem solved. However if you do not then do as below.

Cut a short length (approx. 28mm) of thin wire as shown and strip back about 2mm to expose the metal core. Congratulations, you have just made a very basic 5.8GHz antenna.
Insert it onto the hole being careful not contact the outer ground connection. Re test the range, and if there is a marked improvement it confirms the antenna was the issue and needs replaced.

If these tests show no improvement in signal then it will be an internal issue of the monitor or camera/transmitter. Again simple if you have another fpv system/spares as you can test parts against each other for comparison. If you do not then it is more difficult to be sure.

Remove the back plate of the monitor and visually inspect the solder joints at the sma connector (circled in red), there may be a short between two pins or a joint that is dry.

If not then the problem may be so deep it might not be worthwhile fixing, however you can try replacing the sma socket or even just try re flowing the solder joints on the pins to see if that will fix it.
A note for those beginners/intermediates interested in the Controller, Monitor and CG035 antenna mods:

The stock antenna is pointing straight out inside the controller which is slightly the wrong orientation during normal use for the greatest range, the antenna in the controller is quite poor, essentially just a bare piece of wire for the signal to come out of. To increase the range somewhat you can replace it first with a decent antenna, one designed for 2.4ghz. If you wish to start modding your transmitter I would suggest you start by fitting an external sma socket which means you can screw onto it a whole raft of different commercially available third party antennas offering a wide range of claimed dB ‘boosts’. There are so many antenna mods you can do to improve range that if you research it there's practically no limit to them, hell you can even fit a wifi booster to it to increase the (wattage) output of the controller if you were so inclined.

A ‘simplified’ bit of the theory behind antenna types and dB gain.
Antenna design depends on what they are to be used for. They are generally 'tuned' to a broader frequency range than needed, for economic and practical reasons. For instance while we say this is a 2.4GHz control system it is not exactly 2.4GHz, it could be 2.35 or 2.45GHZ depending on what channel you are using and so if it is calibrated to one end of the spectrum and you change channel it would mean a somewhat reduced range. Focusing in on a specific frequency also requires more precise engineering, driving up cost.

Then we have signal 'pattern'.
To liken the transmission from your controller to a light source is a simple way of describing it.
Think of your controller as a bulb producing a source of light and the antenna as a reflector and lens. Think of using the same power supply and the same 'bulb' giving out the same amount of light but projecting it in a different way.....
The standard antenna produces a slightly squashed dome shaped transmission, sending the signal everywhere more or less equally, including into the ground, somewhat like a naked light bulb pointing down would produce light. Good for use nearby and particularly if you fly at a very variable height and direction.
A cloverleaf or mushroom type antenna projects out and up giving a more 'doughnut' shaped transmission, like a lantern. Good for all around flight but some height is sacrificed, particularly directly above you.
A flat panel (patch or patch array) antenna projects everything almost all in one general direction like a floodlight. Good for long distance flight, in one specific direction, more commonly used with ‘diversity’ receivers often paired with a mushroom antenna.
If we were to use a dish shaped antenna (like a satellite dish) it would be a highly focused pattern like a spotlight and using one of these could increase gain by over 50dB in extreme cases. Almost entirely useless for flight control unless used with a ground station that can track your flight, only really used in fixed wing extreme range cases such as military UAV’s.
So, each of these can be 'seen' progressively further away by the receiver.
The same can be said of the receiving antenna on the quad its self. If it 'looks' for a signal in a limited area, it’s field of view being narrower means it can see the signal from further away. Much like a fisheye lens, a naked eye, binoculars and telescope depending on antenna type. However if it turns away from the source of the transmission with a high gain...
antenna it would be completely uncontrolled or 'blind' using a dish or patch antenna to receive with. Normally the best used is stick, cloverleaf or mushroom type. For instance the probes which NASA sent out, like voyager, have no more power output than a regular walkie talkie radio but because of the precision of the sending and receiving 'antennas' (more like a laser beam than a spotlight) it can be received from literally millions of miles away. Of course it helps that there is comparatively little interference to swamp out the signal in space but you get the idea.

If you need a graphic of this just google ‘antenna transmission pattern’ and that should show you what I mean. The claimed decibel (dB) increase of commercially available antennas rely on this principle and by having a precise calibration of the antenna to the correct frequency range and modifying the 'pattern' or focus of the transmission to give an increase in range.

In order to make your own antenna perfectly matched for optimum range you would need to know the frequency range (bandwidth) in use and a good knowledge of antenna theory. Unfortunately there's a really simple way of determining the signal bandwidth used by the controller...

I say unfortunately. It's called a spectrum analyser. Or an oscilloscope that can go up to 2.4GHz. You hook the controller up to one and measure the maximum and minimum frequency the transmitter uses, that gives the precise frequency range that you calibrate to the middle of. There is a way to hack a pc usb tv stick to open the frequencies up to perform a similar function to this as well, but I've only ever done it once. Even then it was not precisely calibrated making the reading suspect at best, useless at worst.

The current stock antenna used is a 'naked lightbulb' type, probably poorly calibrated, but ok for toy grade use. You can open the controller up and replace it with another better manufactured antenna. Even if this is still a 'naked bulb' type antenna it should be better than the stock one. It means you can use this mod to extend range, even giving is a sort of quasi 'spotlight' antenna if you wanted to, but this means you have to point it in the right direction all the time, it becomes less useful the closer you are, for instance if you do a high speed pass in front of yourself and don't turn the antenna to face the quad all the way along, despite being quite close, you could quite easily loose signal. Or, using the bulb analogy again, try pointing a spotlight at a bird flying by and see how difficult it is to keep it in the light. You want to tailor the antenna for your specific needs.

**Synopsys**

If you are wanting to extend range then I would stick with regular good named brand, antennas for the controller, the fpv monitor and the quadcopter if you want reliability and consistency. They may not be calibrated to your specific channel's frequency range but it should be close enough to give good results.

The next step up could be getting a hobby grade transmitter that you can programme for the CG035 frequencies and codes, but I personally don't know if anyone has been able to do that.....yet, and a diversity receiver for FPV. However If you want to experiment with it then thats cool too, but expect it to be a long process with a lot of trial and error. It will certainly be an education.

Have fun!  

Elio.