Some tips for when you get started building the controller and amplifier boards

Make sure you have the next tools in place before you start.

- Sharp point wire-shears
- Multimeter
- 16 Watt soldering iron (a solder iron of 25watt or higher might get too hot)
- Solder tin with resin core

Where to start

First check if all the parts are there. If they are, start building.
And remember it is never good to get into a rush, take your time.

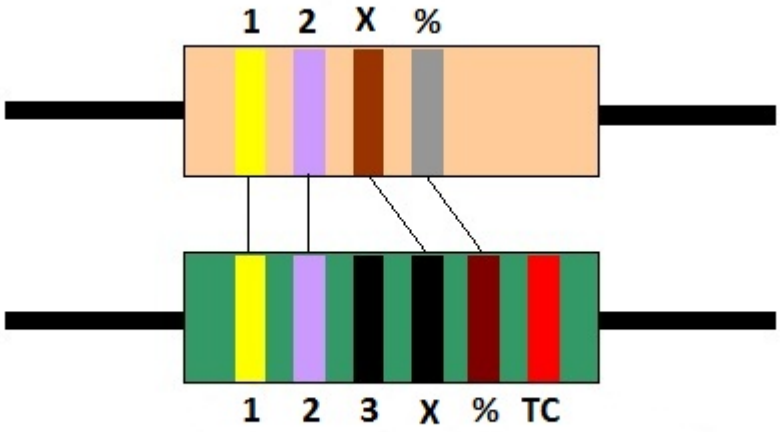
If you don't have any experience, it might help to read the part of Resistors first. This give you a little insight of how you can recognize the right resistor. For the capacitors

- Start to put the smallest components in place, so start with the small capacitors
- Then the resistors and diode
- Mini switches
- Crystal (controller board)
- Now go for the IC sockets (put them in as showed on the board
- Jumpers
- Capacitors (electrolytes) be care full and place them in the right direction + and –
- Breakout board (controller board) Test it first see test the breakout board.
- LED,s also be care full and place them as showed on the board

- RJ45 jack (controller board and amplifier board)
- DC jack (controller board and amplifier board)
- Jack socket PCB 2.1 mm for headphone (amplifier board)
- Terminal block (amplifier board) (NOT when using rod antenna)

Resistors

Color of the rings
Note:
First ring can be closer to the end then the last one.
Last ring can be zilver or gold, the first ring can't.
Last ring can be wider or can be at a bigger distance then the others.



	1	2	3	x	%
Black	-	0	0	x 1	
Brown	1	1	1	x 10	1%
Red	2	2	2	X 100	0.1%
Orange	3	3	3	X 1.000	0.01%
Yellow	4	4	4	X10.000	0.001%
Green	5	5	5	X 100.000	
Blue	6	6	6	X 1.000000	
Violet	7	7	7	-	
Gray	8	8	8	-	
White	9	9	9	-	
Silver		-2	-	X 0.1	
Gold		-2	-	X0.01	

Note: TC is not showed in this table.

Example I

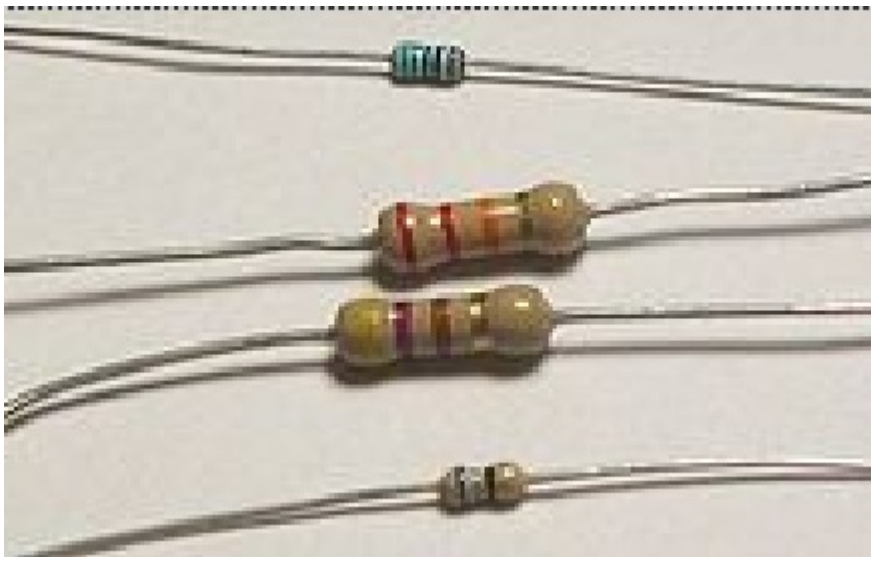
A resistor with the stripes: yellow – violet – red – gold has a value of:

Yellow = 4
Violet = 7
Red = x 100
Is 4700Ω or 4.7KΩ with 5% (gold) tolerance (up and down)

Example II

This resistor has a value of:
Ring 1 = red = 2
Ring 2 = black = 0
Ring 3 = black = x 0
Ring 4 = gold = 0.01
Is 20Ω with a tolerance of 0.01% (up and down)

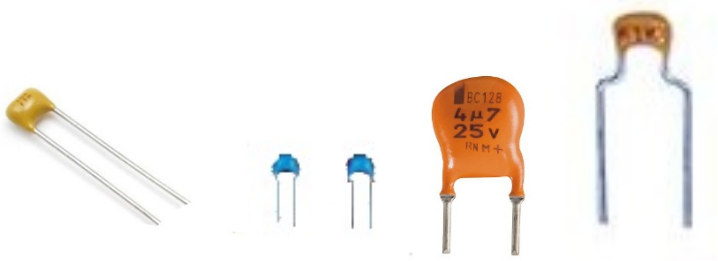
Example III



1st The small one is 560 Ω (Ohm) with a tolerance of 1% (green – blue – black – brown)
2nd 22KΩ (Killo Ohm) with 5% tolerance (red – red – orange – gold)
3rd 470 Ω (Ohm) with 5% tolerance (yellow – violet –brown –gold)
4th 68 Ω (Ohm) with 5% tolerance (blue – gray – black – gold)

Enough is enough lets go on…

Capacitors



As said before, start with these components (capacitors) those smal parts are easy to put on the boards.

Pay attention for these ones they have a + and a – side reconisible on the capacitor.

Connections

Connect the controller board ver.6.8 USB with the amplifier board 5.7 with a straight utp cable.\
Older versions used a cross over cable. DON'T USE it for the latest boards !!

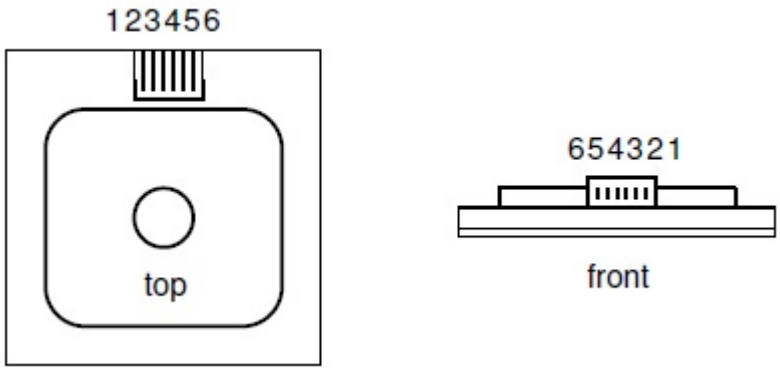
Connect the GPS module with the controller board.
Fi. X shows the connections.
It deviate with the previous boards so be sure if you only update your boards that you have to re-wire the connection between the GPS and the controller board.

In case you use rod antennas.
Connect the rod antennas to the amplifier board.
You MUST solder the wires directly to the board, so DON'T use the terminal block.
Solder the wire with the knot to the + and the one without the knot next to it. The wire from the shield goes to the position marked GND.

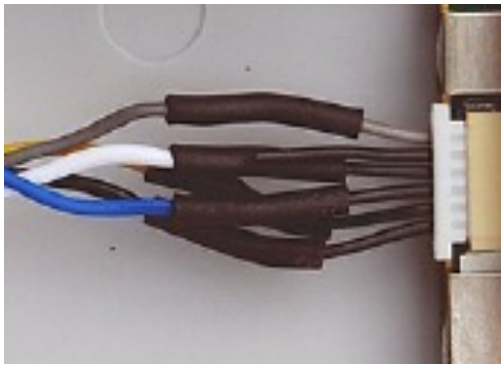
Carefully cut the connector and stripe the leads
Extend the leads with wire so it will become easy to attach them to a longer cable.

You can use an old or new UTP cable (There are 8 wires inside them, you only need 6 of them)

10 meters seems to work for me. On the other end you can solder a 6 wire piece of flat cable. That makes it easy to connect it to the 6 pins connector. Convince yourself that pin 1 of the GPS EM-406A is connected to pin 1 of the connector

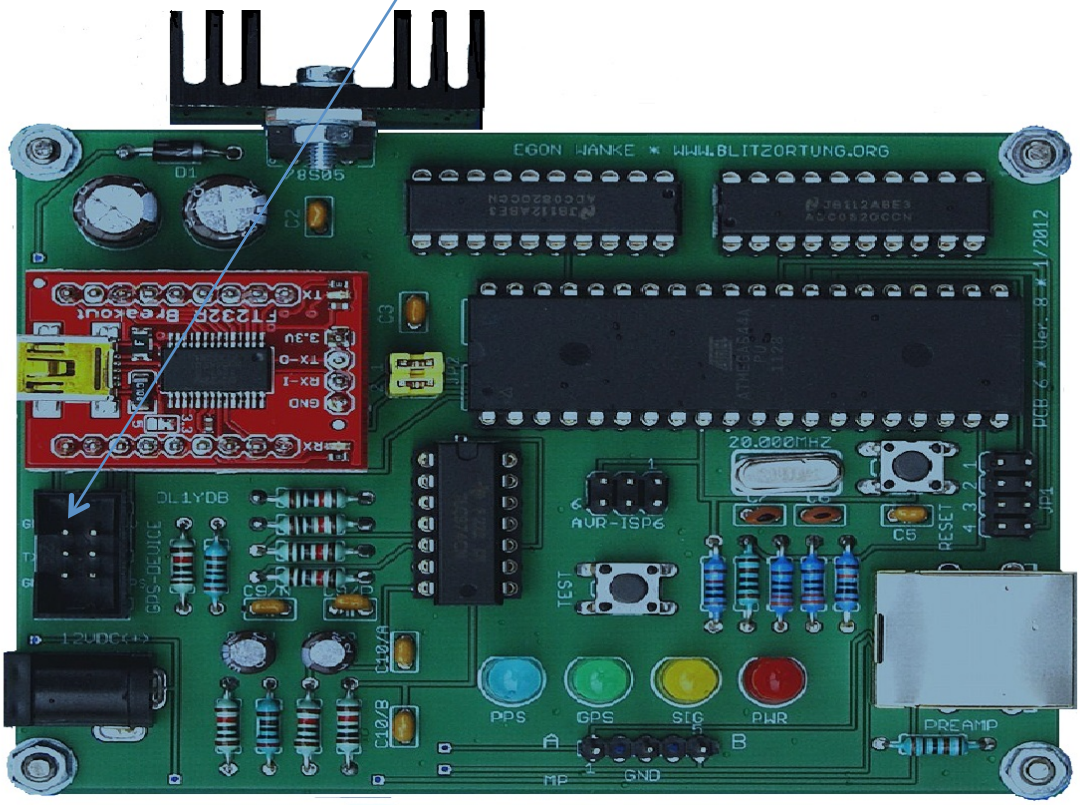


View of the EM-406A



Extend the wire carefully.

Pin one (1) on the controller board is here.



Also be sure to put the IC in the right position. A dot marks pin 1 or if there isn't a dot pin 1 is left of the notch.

Power

The power (12V) could be connected to the amplifier board or to the controller board. So just connect the power to one of the boards. The UTP cable will supply the other board of 12 Volt. When the power is connected, the red led will burn (when the utp cable is in place both red leds – one on each board will burn)

Jumper settings

If you are using rod antennas, you can use the jumper setting as in the manual.
Just take a look at the pictures of the boards. Again convince yourself that you are looking to the right board.

Amplifier board 5.7
Controller board 6.8 usb.