K.I.T.T. Dash s1/2 wiring kit

Thanks for purchasing wiring kit for dash s1/2.
With the right cables, and these easy to follow step-by-step guide,
wiring up your dash electronics is a breeze!

Package contents

Please take a moment to inspect package contents and get accostumed to terminology to clearly identify which is which.

Wires

Wire color	Gauge	Length	Function
Red thick wire	AWG 20 0.5mmq	20 ft 6 m	Global Power distribution, +12V
Black thick wire	AWG 20 0.5mmq	20 ft 6 m	Global Power distribution, GND
Red thin wire	AWG 22 0.35mmq	3 ft 1 m	Local Power distribution, +12V
Black thin wire	AWG 22 0.35mmq	3 ft 1 m	Local Power distribution, GND
Multicolor wires (*)	12x AWG22 12x 0.35mmq	12x 3 ft 12x 1 m	Boards to car sensors Boards to user pushbuttons
Gray-Pink Short wire	AWG22 0.35mmq	2 ft 50 cm	VFD between speedo and message Power PANP key to Step Relay
Transparent bifilar	2x AWG 24 2x 0.22 mmq	6 ft 2 m	Left speaker to voicebox audio input
Cable	4x AWG24 4x 0.22mmq	4x 1ft 4x 30cm	Countdown to Voicebox
Cable	10x AWG24 10x 0.22mmq	10x 4 ft 10x 125 cm	PANP keys to Voicebox

(*): Brown, Dark Blue, Mid Blue, Light Blue, Dark Green, Green, Purple, Pink, Orange, Yellow, Gray, White

Miscellaneous

Fuse holder	cable mount	in line	Main power input +12V protection
Fuse	20mm	5 Ampere	Main power input +12V protection
Screw terminal	6 ways		Voicebox to Countdown split point
Screw terminal	1 way		GND mains input point
Screw terminal	2 ways		+12V and GND splitting point between power PANP key step relay/voicebox sub assembly and remainder of dash

Sub Assemblies

We highly recommend wiring up the dash as three sub-assemblies, instead of a monolyth block. it's easier to separate the sub-assemblies from one other, should the need for maintenance arise in the future. It's also easier on first installation, to test the sub-assemblies each one by one for working OK, before connecting all the three sub assemblies together into one dash.

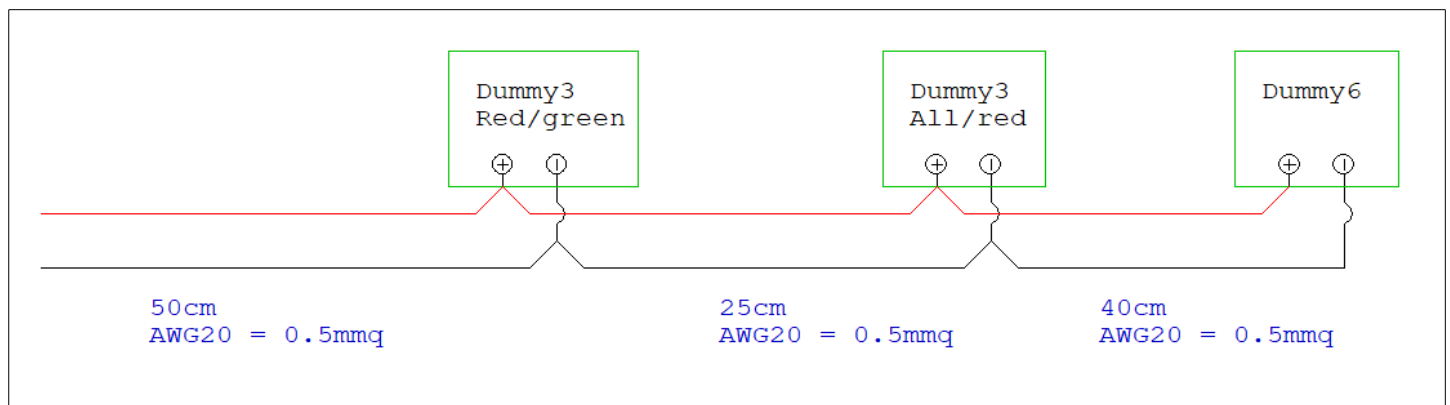Sub assembly #1 : Dummy3 all/red, Dummy3 red/green, Dummy6

Sub assembly #2 : Tacho, Speedo, Message center

Sub assembly #3 : PANP keys, step relay, voicebox

Sub assembly #1

Three boards in this sub-assembly:
- Dummy display 3 rows, all red
- Dummy display 3 rows, red/green
- Dummy display 6 rows

```
        Dummy3              Dummy3             Dummy6
        Red/green           All/red
         ⊕  Ⓘ                ⊕  Ⓘ               ⊕  Ⓘ

    50cm                 25cm               40cm
    AWG20 = 0.5mmq       AWG20 = 0.5mmq     AWG20 = 0.5mmq
```

Step 1 - Sub Assembly #1

These boards just need power supply.
Please locate +12V and GND screw terminals on each board.
Please use global power distribution wire:
  AWG20=0.5mmq Red wire for +12V
  AWG20=0.5mmq Black wire for GND
you can daisy-chain the power supply wires,
there is no need for tree/star power distribution.

You can test this sub-assembly by appling power supply

Sub assembly #2

Three boards in this sub-assembly:
- Message center
- Speedo
- Tacho

We divide sub assembly 2 in three steps:
Step 2: Mount the message center onto the speedo,
Step 3: We have to perform power distribution as in sub assembly 1.
Step 4: In addition, we have to perform sensors to car, and wires to pushbuttons.
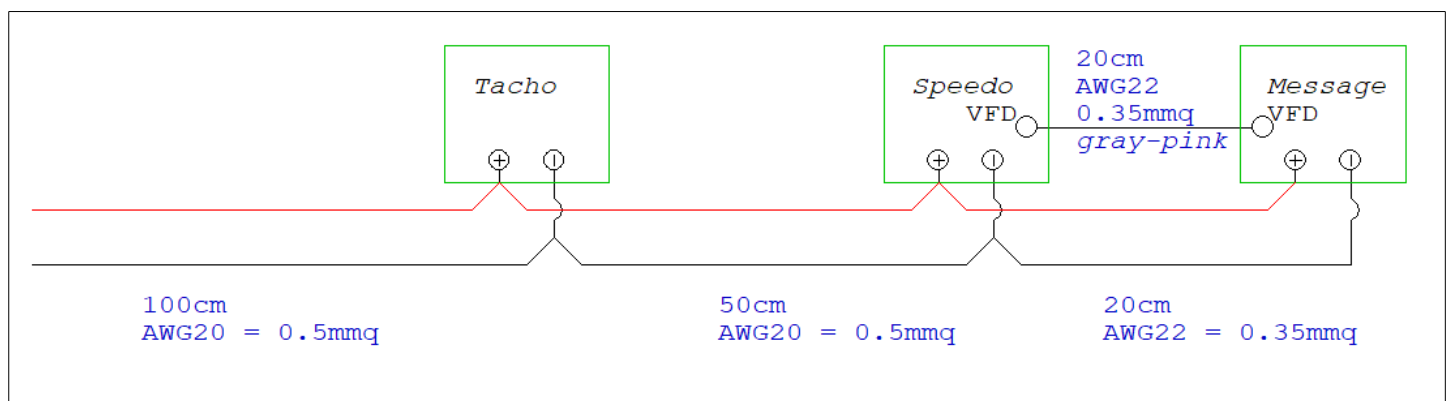
Step 2: Mount the message center onto the speedo
If not already done, please first mount the message center onto the speedo,
Please follow instructions in "KITT Spacers kit for Dash s1/2" pdf
to attach message center board onto speedo board using M3 screws, washers and nuts

Step 3: Let's perform power distribution

Again we daisy-chain, as in sub assembly #1.

Please use AWG20=0.5mmq global power supply distribution red and black wire for power input to tacho, and between tacho and speedo. Use smaller gauge AWG22=0.35mmq local power distribution red and black wire between speedo and message.

Even if it's not power distribution, you can also perform VFD screw terminal on speedo to VFD terminal on message center connection now during this step, because it makes sense performing it now!
Use gray-pink wire AWG22 = 0.35mmq 20cm

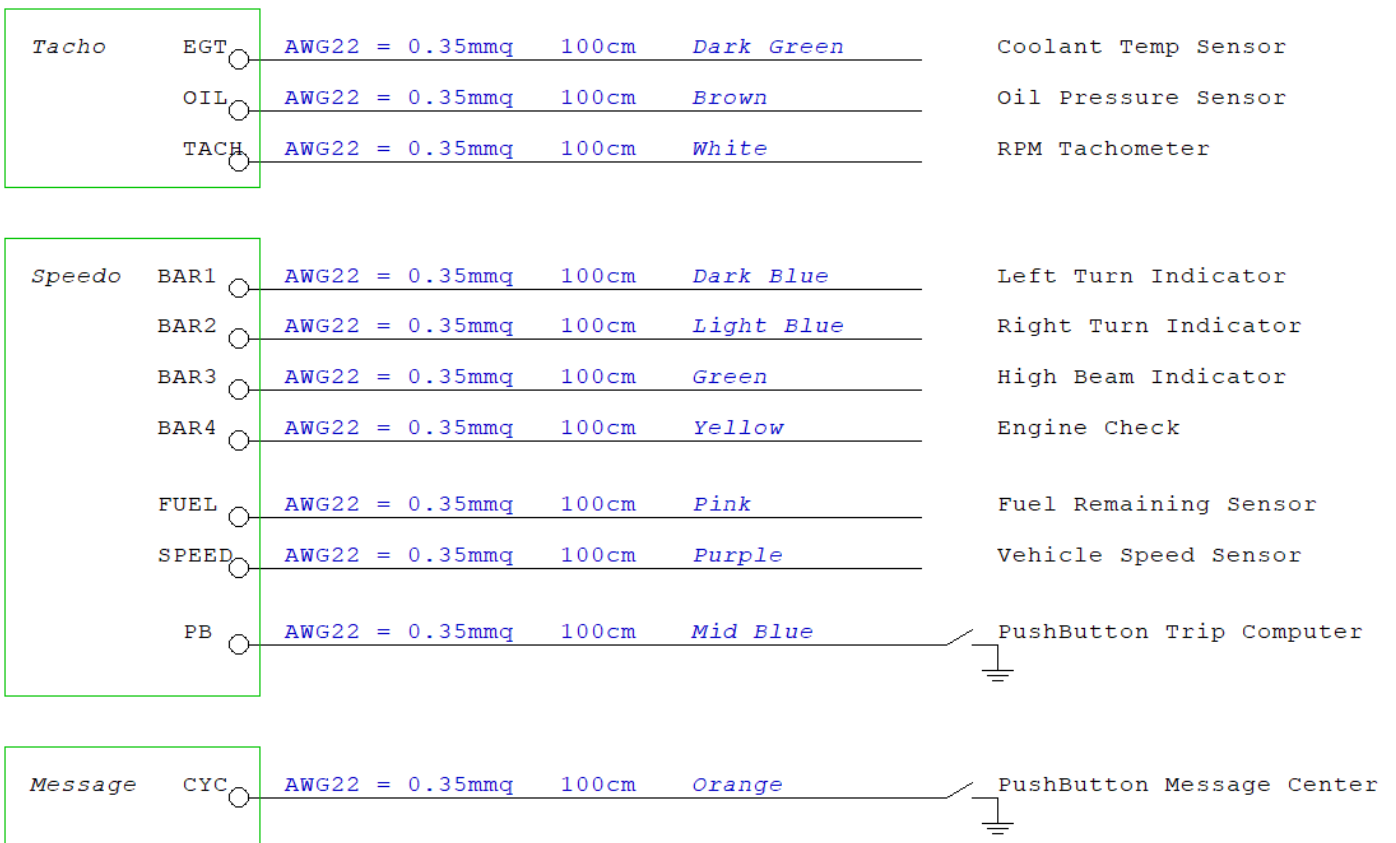You can test for powering up this sub-assembly by inputting power

Step 4: And then we have sensors to car and wires to pushbuttons

We use 1 meter long AWG22 = 0.35mmq wires for these connections.
It's just one end to the screw terminal.
Other end goes either to a car sensor, or to a pushbutton.
We recommend this color-scheme:

Board	Screw Terminal	Recommended wire color	General Motors wire color in car
Tacho	EGT	Dark Green	Dark Green
Tacho	OIL	Brown	Tan
Tacho	TACH	White	White
Speedo	FUEL	Pink	Pink
Speedo	SPEED	Purple	Green or Purple
Speedo	BAR1 (Left Turn)	Dark Blue	Dark Blue
Speedo	BAR2 (Right Turn)	Light Blue	Light Blue
Speedo	BAR3 (High Beams)	Green	Light Green
Speedo	BAR4 (Engine Check)	Yellow	Brown/White or Yellow

Speedo	PB (Trip computer)	Mid Blue	User PushButton
Message	CYC (Change message)	Orange	User PushButton

Wires have two ends. One end to boards. One end to sensors/pushbuttons on car.
For now, just connect the end toward the boards, into the screw terminals.
We will connect other end to car sensor and pushbuttons later.

```
 Tacho    EGT○─── AWG22 = 0.35mmq    100cm    Dark Green    Coolant Temp Sensor

          OIL○─── AWG22 = 0.35mmq    100cm    Brown         Oil Pressure Sensor

         TACH○─── AWG22 = 0.35mmq    100cm    White         RPM Tachometer


 Speedo  BAR1 ○── AWG22 = 0.35mmq    100cm    Dark Blue     Left Turn Indicator

         BAR2 ○── AWG22 = 0.35mmq    100cm    Light Blue    Right Turn Indicator

         BAR3 ○── AWG22 = 0.35mmq    100cm    Green         High Beam Indicator

         BAR4 ○── AWG22 = 0.35mmq    100cm    Yellow        Engine Check


         FUEL ○── AWG22 = 0.35mmq    100cm    Pink          Fuel Remaining Sensor

        SPEED○── AWG22 = 0.35mmq    100cm    Purple        Vehicle Speed Sensor


           PB ○── AWG22 = 0.35mmq    100cm    Mid Blue      PushButton Trip Computer


 Message  CYC○── AWG22 = 0.35mmq    100cm    Orange        PushButton Message Center
```

Sub assembly #3

In sub assembly #3 we find:
- PANP keys
- Step Relay
- Voicebox
- CountDown

We divide sub assembly 3 in three steps:
Step 5 : CountDown to Voicebox and +12V power local distribution
Step 6 : Panp keys power distribution with step relay
Step 7 : Panp keys to Voicebox

<u>Step 5 : CountDown to Voicebox and +12V power local distribution</u>

We could connect countdown directly to voicebox, but to provide a link-unlink post, we use a 6 ways screw terminal in between, instead. Connect the countdown to one side of the 6-ways screw terminal.
Positions 1# 2# 3# 4# on screw terminal are for lamps negative (black wires) #1 #2 #3 #4.
Perform these connections: black wires from countdown into screw terminal positions #1 #2 #3 #4.
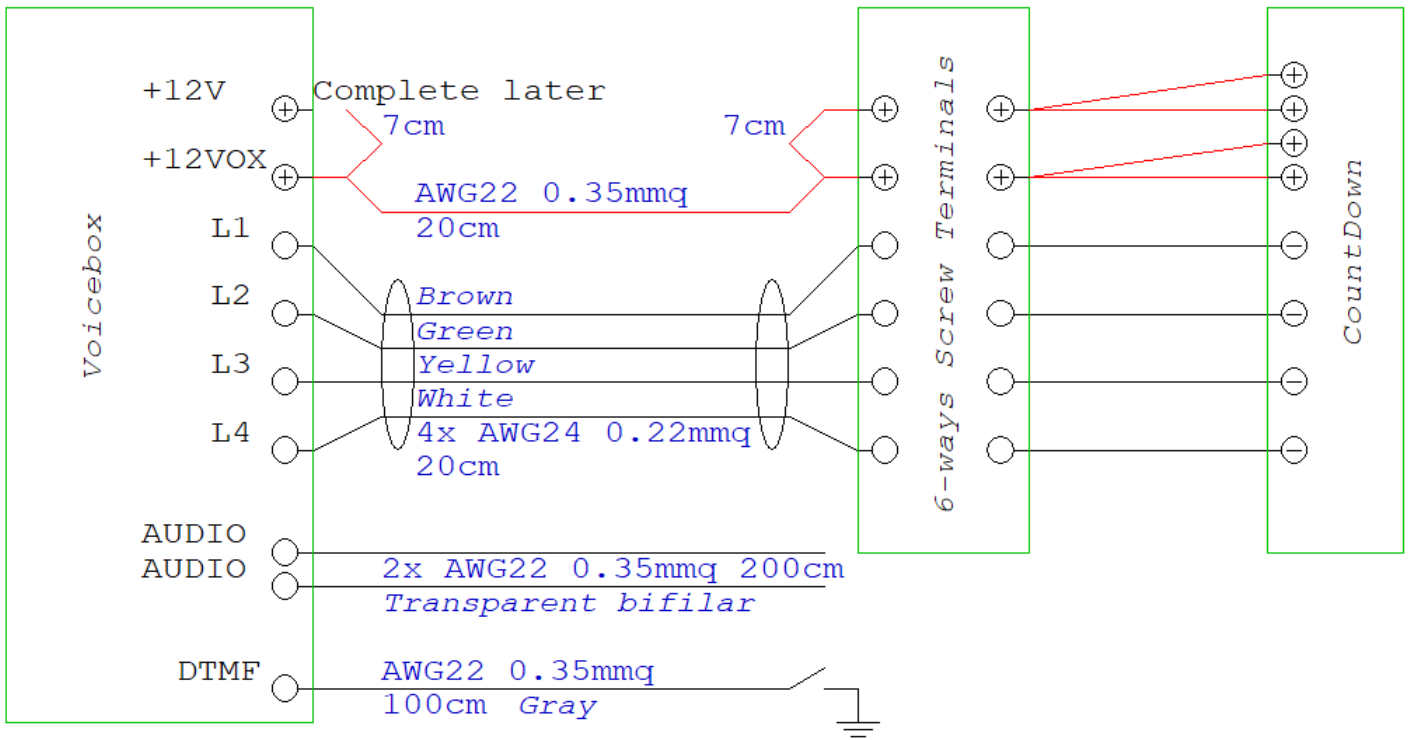Position 5# and 6# on screw terminal, both are for +12V, that is red wires.
On countDown you find 4 red wires. But we have only two positions on screw terminal for red wires.
Therefore we'll just put two red wires in position#5 and two red wires in position #6.
We have connected countdown to 6 ways screw terminal.

Now cut a length of 20cm 4-wires cable. This is 4x AWG24 = 4x 0.22 mmq cable. Please look: inside this cable, you find 4 individual wires. Internal wires colors are: brown, green, yellow, white. We use these four wires to connect to L1 L2 L3 L4 (Lamp1, Lamp2, Lamp3, Lamp4 external lamp drive outputs) on voicebox. Please locate these screw terminals on voicebox. To associate colors to positions 1 to 4, we use this very old trick that every old school electronic engineer uses: we sort colors from darker ones to brighter ones. So we have brown (darkest) = 1. Then green = 2. Then yellow = 3. Then white (lightest) = 4. This way it's easy to remember color assignement!

Use this 4-wires cable to connect L1 L2 L3 L4 on voicebox to screw terminal to countdown positions #1 #2 #3 #4.

Figure: Wiring diagram. Voicebox terminals (left): +12V, +12VOX, L1, L2, L3, L4, AUDIO, AUDIO, DTMF. Labels: "Complete later", "7cm", "7cm", "AWG22 0.35mmq 20cm", wire colors "Brown", "Green", "Yellow", "White", "4x AWG24 0.22mmq 20cm", "2x AWG22 0.35mmq 200cm Transparent bifilar", "AWG22 0.35mmq 100cm Gray". Center-right: "6-ways Screw Terminals". Right: "CountDown".

In this step we also perform local +12V power distribution. Use AWG22 = 0.35mmq red wire. Start daisy-chaining from the countdown screw terminals. A short 7cm between the position#5 and position#6 on screw terminals. Then continue with 20cm to +12VOX. Then continue with a short 7cm between +12VOX and +12V. Don't insert in +12V end, yet, but leave it floating. We will insert this in Step 3, because we have to continue the daisy-chain further, later.

In this step we also add the 2m long transparent bifilar speaker wire to voicebox AUDIO input, which goes to left speaker in car. Connect screw terminals side on voicebox. Leave the other end to car speaker unconnected for now. We will connect it later.

In this step we also connect one gray wire to DTMF request input. Connect just voicebox side for now. Leave the other end unconnected for now. We will connect dtmf request pushbutton later.
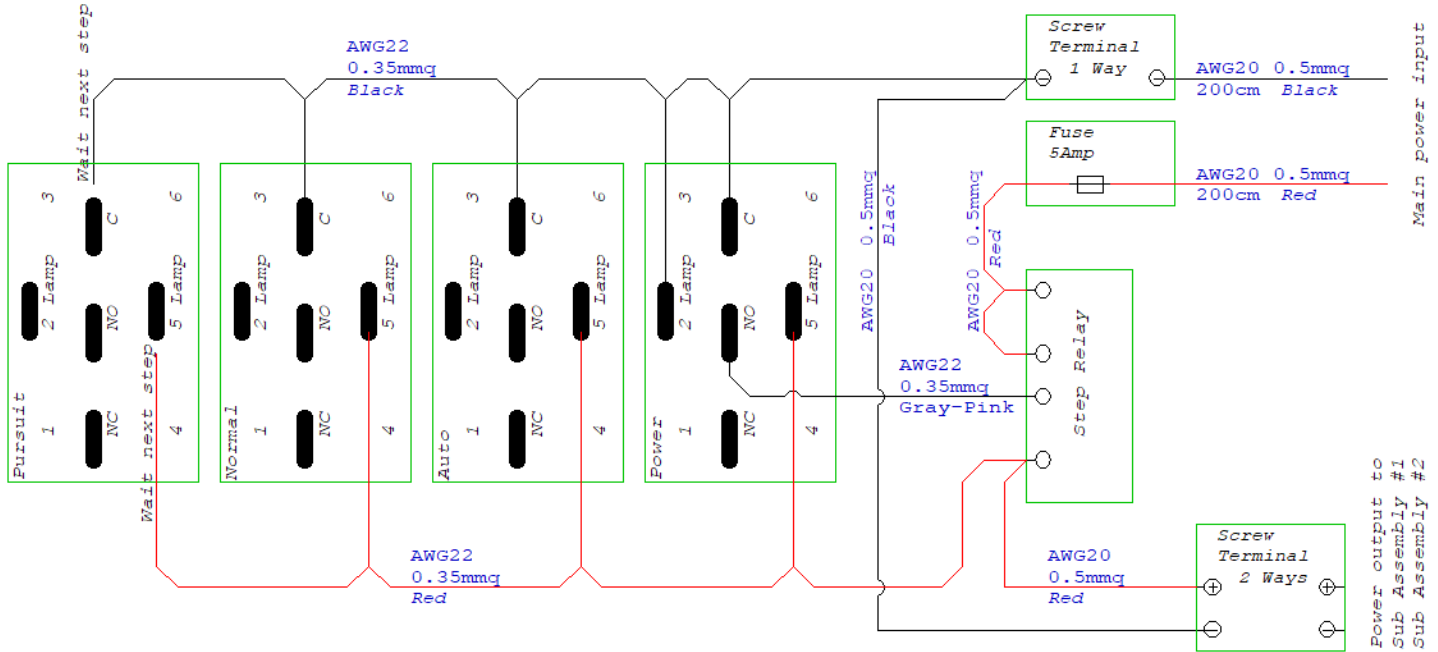
In this step we distribute both global power (that requires bigger gauge, thicker wires)
and local power (that requires smaller gauge, thinner wires)

a) **global** power with the **AWG20** = 0.5mmq red and black wires
   main power input: use 2m wires for now. You can always trim them shorter later if needed.
   red wire +12V mains goes trough a in-line fuse 5Amp, then to step relay
   step relay switching the +12V line
   power output to sub assembly #1 and #2 (via 2 ways screw terminal)
   gnd input to output line (via the 1 way and 2 ways screw terminal)

b) **local** power with the **AWG22** = 0.35mmq red and black wires
   black wire: starts at 1 way screw terminal (GND)
   black wire: daisy-chain on the "C" common switch pin of the panp keys
   black wire: also pin 2 of the lamp of the Power PANP key in the same GND daisy-chain
   red wire: starts at Step relay switched output (+12V switched line)
   red wire: daisy-chain on the "5" lamp pin of the Power PANP key

It makes sense to also perform in this step:
c) Gray-Pink wire: from Step Relay to "NC" pin of the Power PANP key
   so that the power key can switch power on and off via the step relay

Please note we also insert a 5 Amp Fuse in-line with the +12V power input

We use 1way screw terminal to split GND power input in two:
one routing input to output, the other routing input to local distribution.

We use 2ways screw terminal to provide a splitting point between sub-assemblies.
This we're mounting now is Sub Assembly 3. The 2 ways screw terminal outputs power supply to
SubAssemblies #1 and #2 that we assembled earlier. Don't connect these subassemblies yet, we will do
this later. But do connect now one side of the 2 ways screw terminal to provide power output on screwT.

Smart tip: don't connect just yet the small wire "C" pin on Pursuit PANP key: we will continue the GND
daisy-chain in next step. Don't connect just yet the small wire "5" lamp pin on Pursuit PANP Lamp: we will
continue the +12V daisy-chain in next step. It's more practical to connect two wires together to a pin,
instead of adding to existing single wire a second wire later.

You can test the power PANP key switching its own lamp on and off with the step relay

Step 7 : Panp keys to Voicebox

There are 8 connections to do between panp keys and voicebox
We use 10xAWG25 = 10x0.22mmq cable
Please cut a good 10cm of the outer PVB tube, both sides, to reveal the interior wires
Since we need 8 connections, but cable has 10 wires, we will not use two wires (gray and violet)

PANP keys connection	Wire color	Voicebox Connection
Switched +12V line	Red	+12V power input screw terminal
GND	Black	GND power input screw terminal
Auto Key pin "NO"	Blue	A key input Screw terminal
Auto Lamp pin 2	Brown	LA Screw terminal
Normal Key pin "NO"	Green	N key input Screw terminal
Normal Lamp pin 2	Yellow	LN Screw terminal
Pursuit Key pin "NO"	Pink	P key input Screw terminal
Pursuit Lamp pin 2	White	LP Screw terminal
(no use)	Gray	(no use)
(no use)	Violet	(no use)
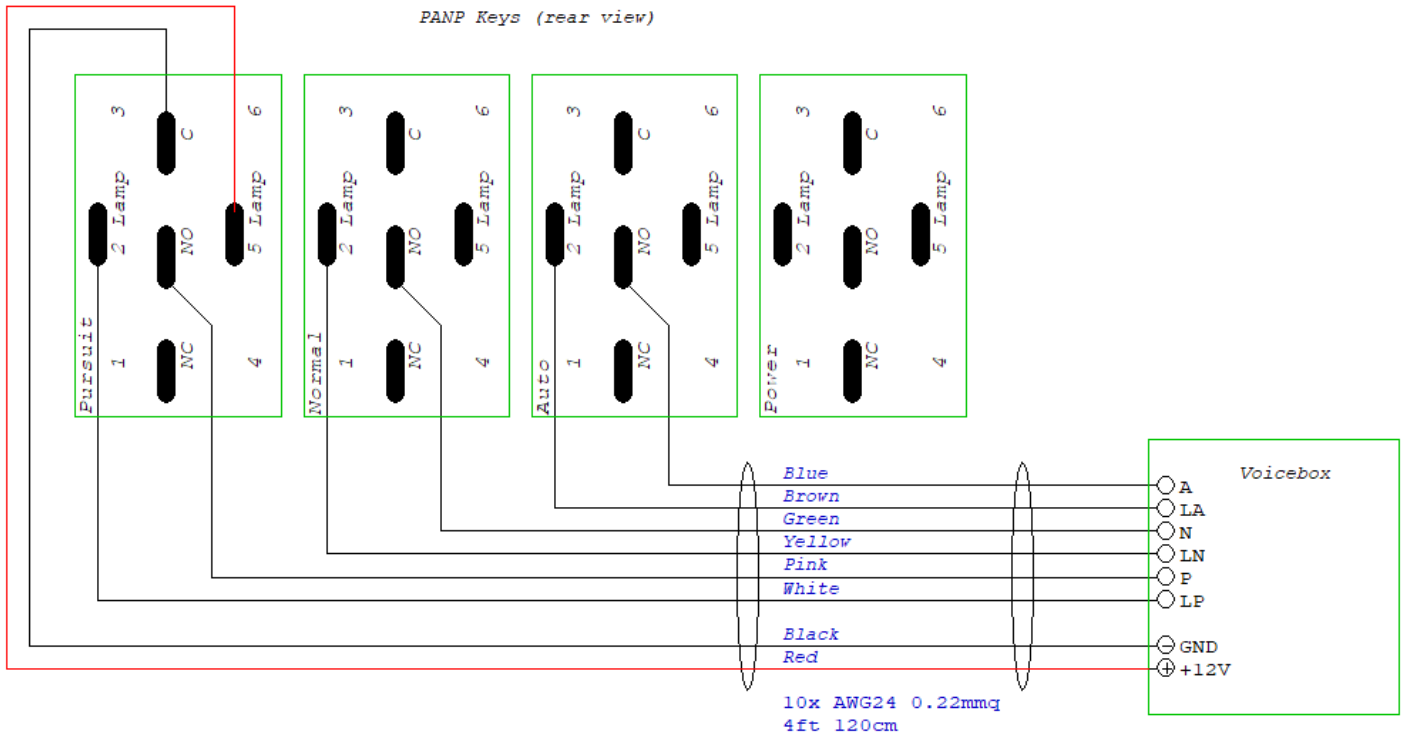
We are completing the left-overs daisy chaining of previous steps now.
We had three of them: voicebox +12V; pursuit key C; pursuit key Lamp pin 5.

Join the two 4x cables, into one 8x cable, by using zip-ties
You can now test the power, auto, normal, pursuit keys and lamps, driven by voicebox
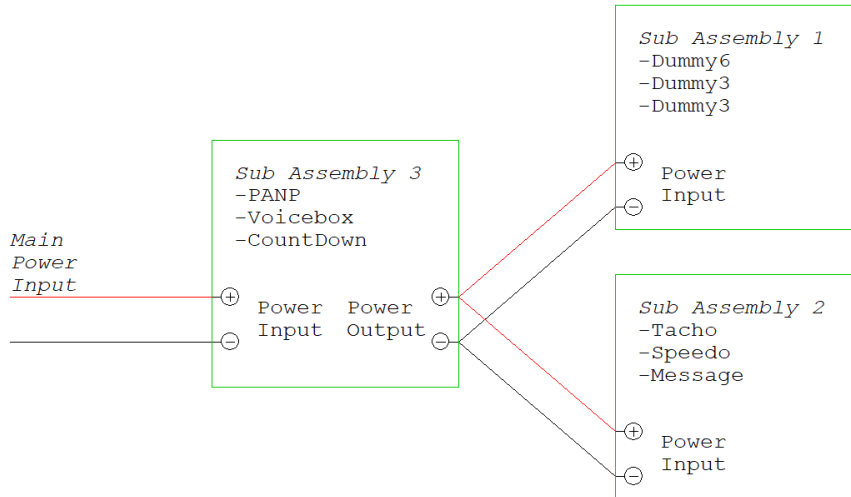
Connecting all sub-assemblies together

Just route the black and red wires power inputs:
- of sub assembly 1 [dummy3 + dummy6]
- and sub assembly 2 [tacho, speedo, message]
into the two ways screw terminal power output of sub assembly 3 [panp, voicebox]

```
                                              Sub Assembly 1
                                              -Dummy6
                                              -Dummy3
                                              -Dummy3
                        Sub Assembly 3
                        -PANP                ⊕  Power
                        -Voicebox            ⊖  Input
                        -CountDown
   Main
   Power                                      Sub Assembly 2
   Input          ⊕  Power   Power  ⊕        -Tacho
                     Input   Output ⊖        -Speedo
                  ⊖                           -Message

                                             ⊕  Power
                                             ⊖  Input
```

You can now test all dash powering up and down pressing on the Power PANP key

Attach the sensor wires, pushbuttons and speaker, that you left unconnected previously.
Smart tip: attach one at time, and test one at time.
So if something ceases working after adding "that next wire" you know which wire was guilty.
If you attach everything together before testing, you're lost at knowing which connection if wrong.

Enjoy

You're done! Enjoy your KITT dash s1/2 electronics!

Feel free to contact us for any doubts on wiring
or to submit suggestions to improve this documentation

http://www.ideegeniali.it/contact