

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

version 1.0  
july 2020

Thanks for purchasing wiring kit for dash s1/2.

## Package contents

### Wires

Wire color	Gauge	Length	Function
Red wire	AWG 20 = 0.5mmq	6 meters	Global Power distribution, +12V
Black wire	AWG 20 = 0.5mmq	6 meters	Global Power distribution, GND
Multicolor wires	12x AWG22 = 12x 0.35mmq	12x 1 meter	Red: local power distribution, +12V Black: local power distribution, GND All other colors: Connections to car sensors and pushbuttons
Extra wires	AWG22 = 0.35mmq	100cm gray 400cm red/blue 20cm purple 20cm purple	Voicebox DTMF_Req Voicebox AUDIO input VFD between speedo and message Power PANP key to Step Relay
Cable	4x AWG24 4x 0.22mmq	4x 2.5 meters	Connections between Voicebox and PANP keys Voicebox and Countdown

### Miscellaneous

Fuse holder	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
Zip ties	Quantity = 5		Connect two 4x cables into one 8x cable

# Sub Assemblies

We highly recommend wiring up the dash as three sub-assemblies, instead of a monolith 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

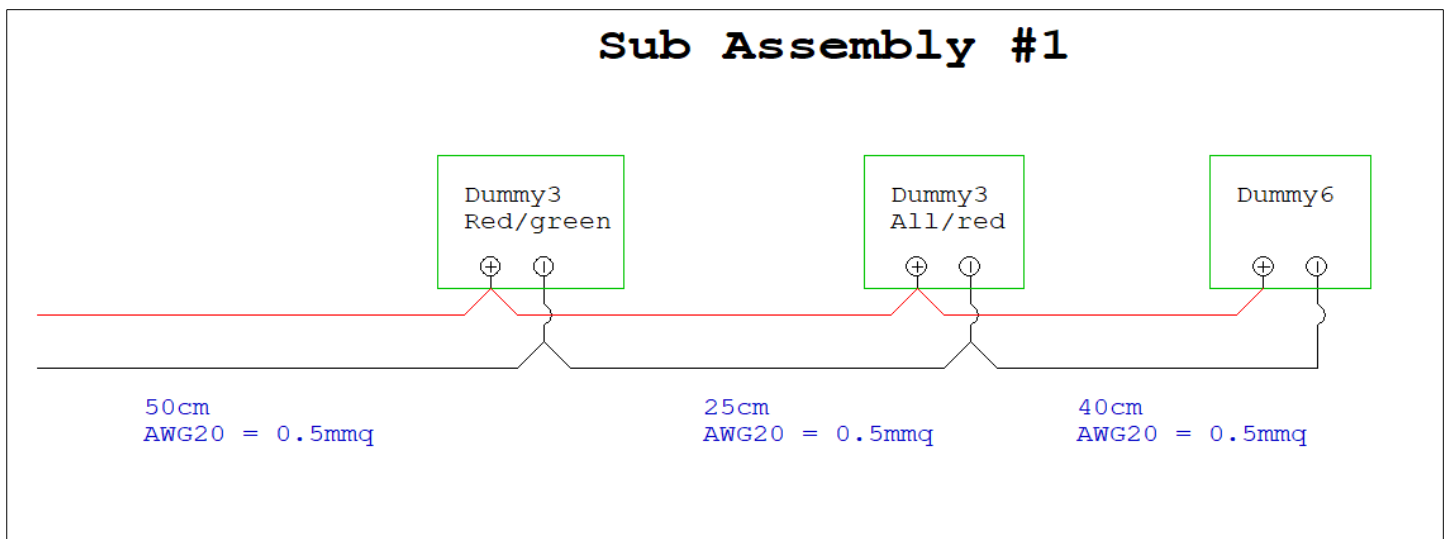
Sub assembly #2 : Tacho, Speedo, Message center

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



### 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 applying 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.

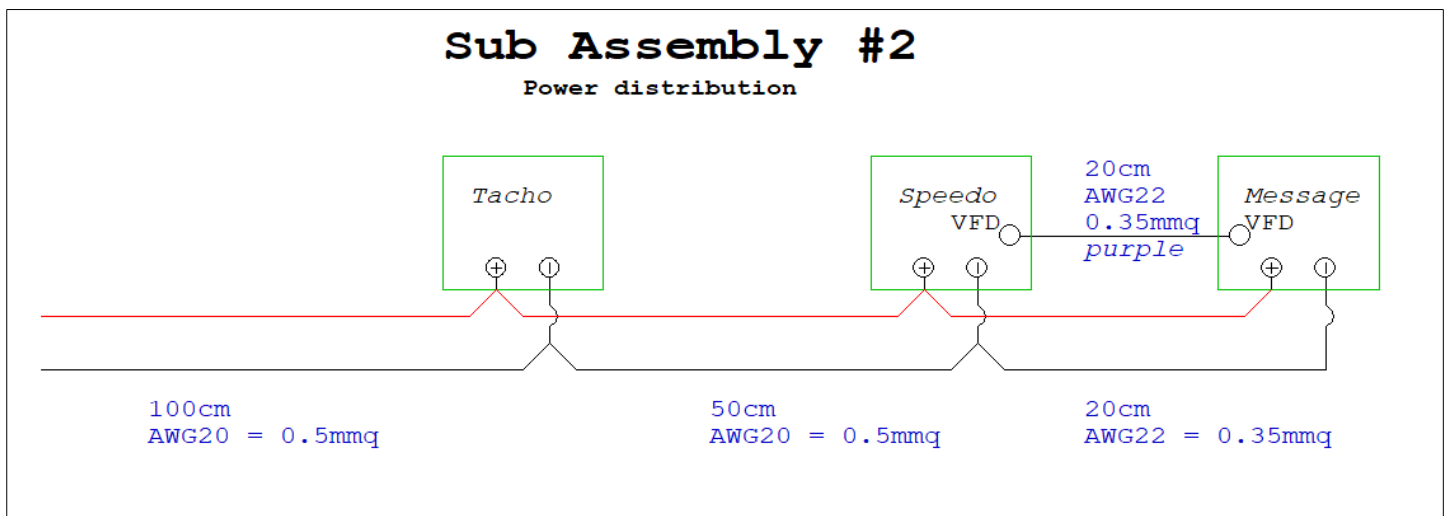
Step 2: Mount the message center onto the speedo

If not already done, please first mount the message center onto the speedo,

Please follow instructions in "KIT 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 purple 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:

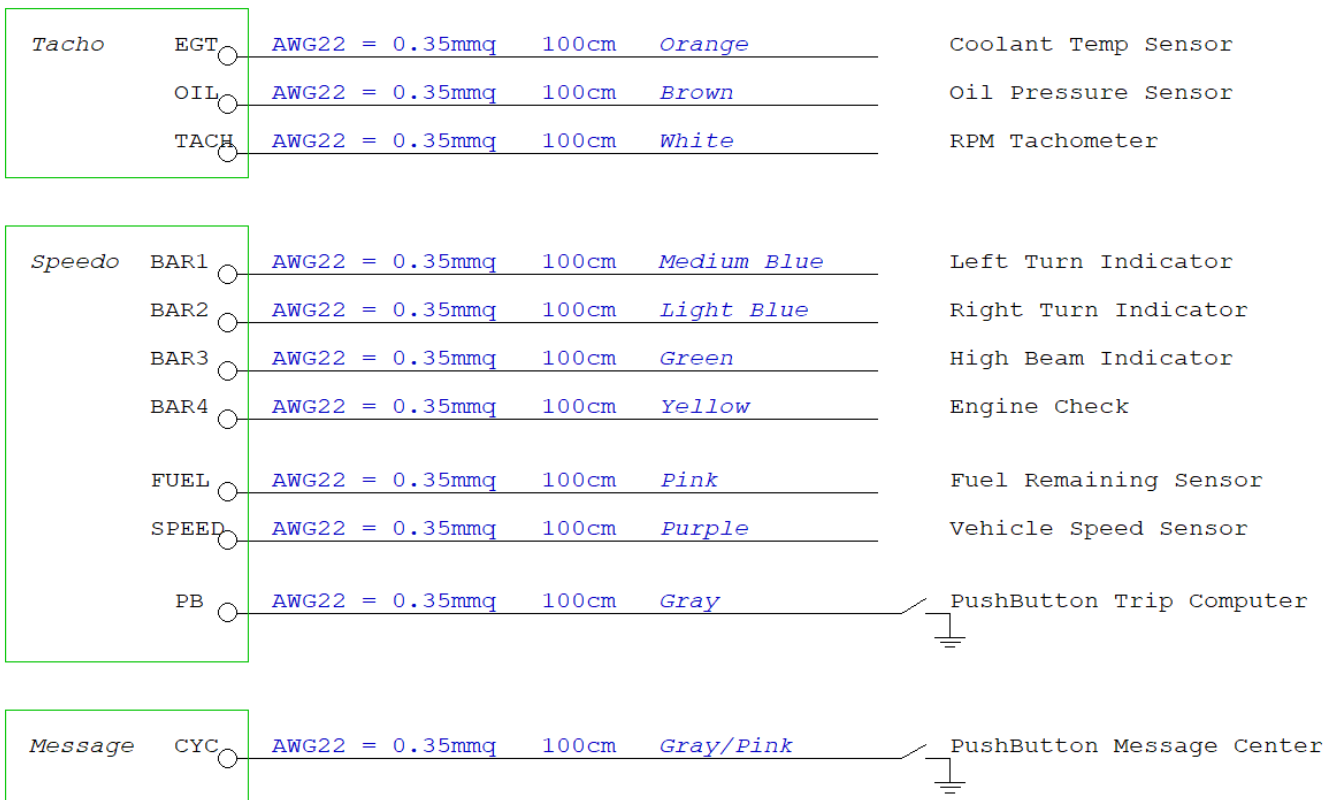
Board	Screw Terminal	Recommended wire color	General Motors wire color in car
Tacho	EGT	Orange	Dark Green
Tacho	OIL	Brown	Tan
Tacho	TACH	White	White
Speedo	FUEL	Pink	Pink
Speedo	SPEED	Purple	Green or Purple
Speedo	BAR1 (Left Turn)	Medium Blue	Dark Blue
Speedo	BAR2 (Right Turn)	Light Blue	Light Blue
Speedo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

Speedo	PB (Trip computer)	Gray	User PushButton
Message	CYC (Change message)	Gray/Pink	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.

## Sub Assembly #2

Sensors and PushButtons



## 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

Step 5 : Countdown to Voicebox and +12V power local distribution

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.

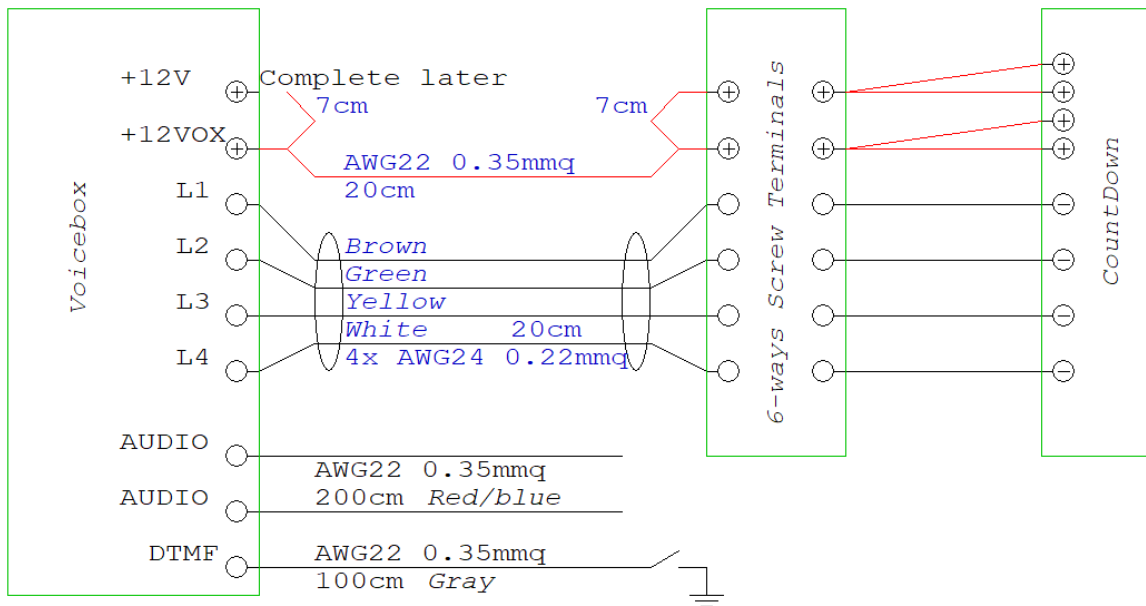
Therefore we'll just put two red wires in position#5 and two red wires in position #6.

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!

# Sub Assembly #3

## Voicebox to Countdown



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

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.

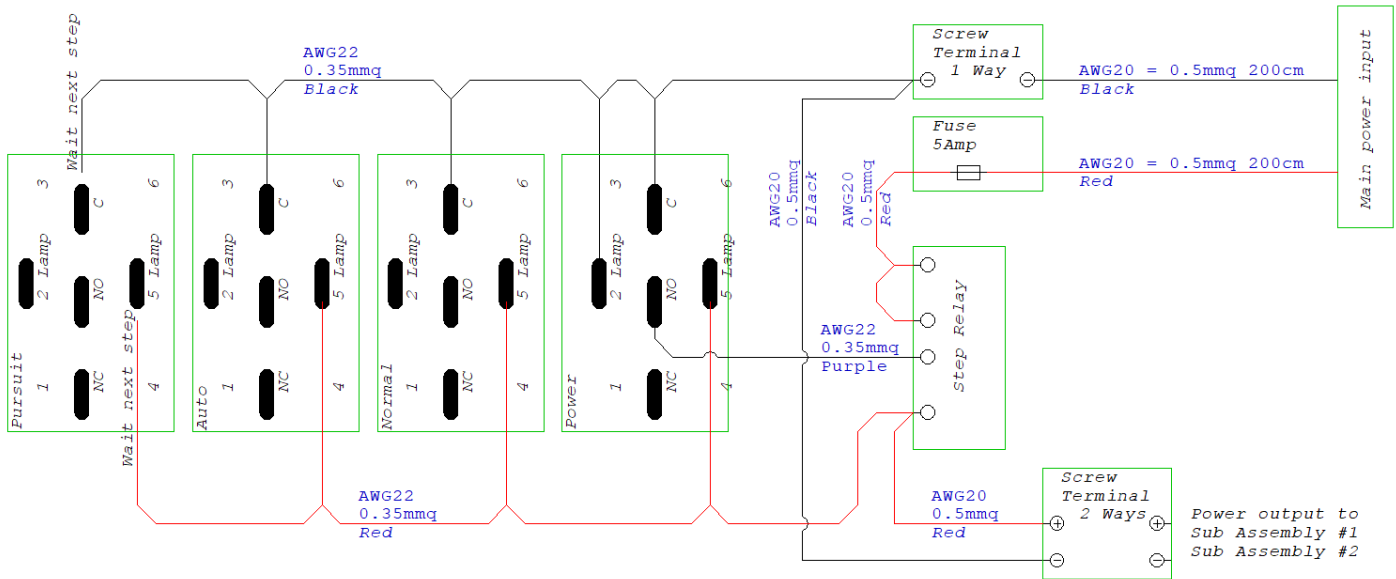
In this step we also add two 2m long wires to AUDIO input, which go to left speaker in car. Connect screw terminals side to voicebox of these two wires. Leave the other end to car speaker unconnected for now. We will connect it later.

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.

## Step 6 : Panp keys power distribution with step relay

### Sub Assembly 3

Power distribution PANP Keys and Step Relay



In this step we distribute both global power (that requires bigger gauge, thicker wires) and local power (that requires smaller gauge, thinner wires)

- 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 through 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)
- 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:

- purple 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 screw.

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. It's more practical to connect two wires together to a pin, instead of adding to existing single wire a second wire later.

Smart tip: 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.

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 two 110cm pieces of the 4xAWG24 = 4x0.22mmq cable

Please cut a good 10cm of the outside tube, both sides, to reveal the interior wires

There are four wires, colored: brown, green, yellow, white

On cable#1 please use a marker to paint in red the white wire, both ends

On cable#2 please use a marker to paint in black the white wire, both ends

This way you can visually tell who is cable#1 [red] and who is cable#2 [black]

### Cable#1

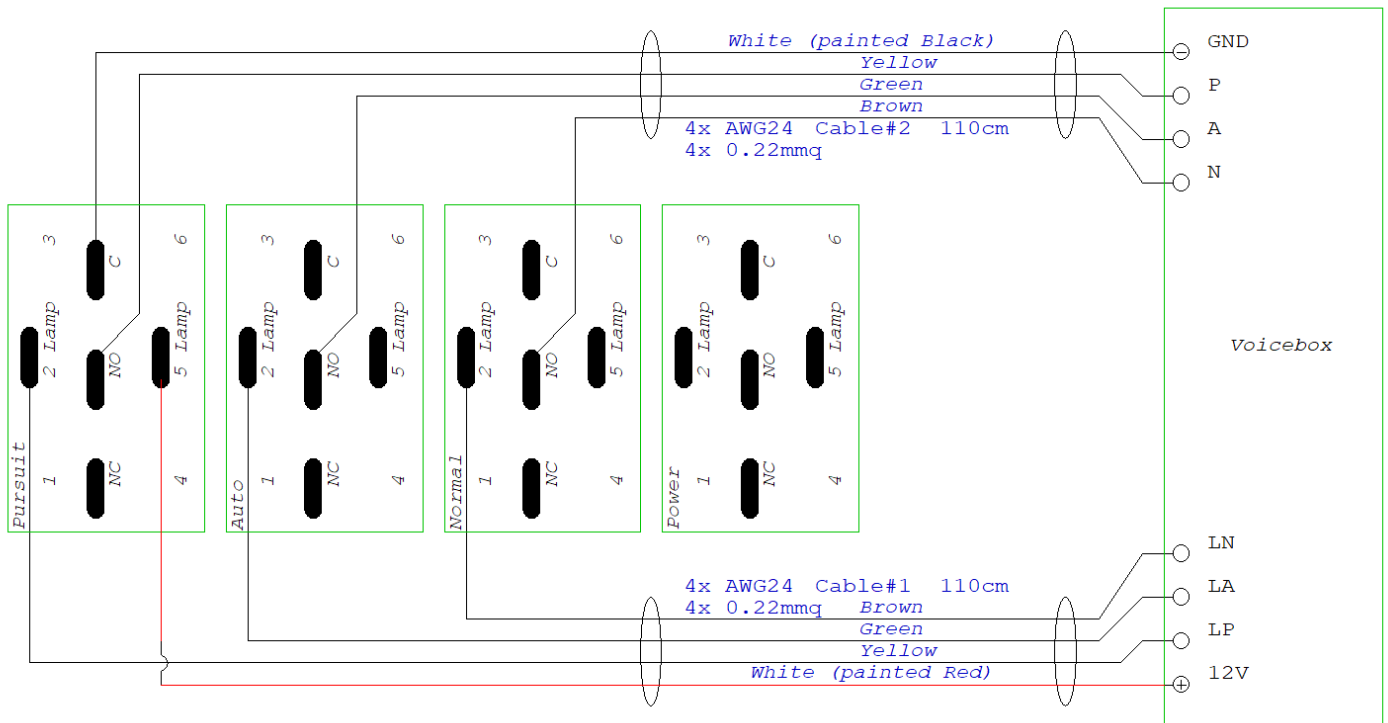
PANP keys connection	Wire color	Voicebox Connection
Normal Lamp pin 2	Brown	LN Screw terminal
Auto Lamp pin 2	Green	LA Screw terminal
Pursuit Lamp pin 2	Yellow	LP Screw terminal
Switched +12V line	White -> painted to Red	+12V power input screw terminal

### Cable#2

PANP keys connection	Wire color	Voicebox Connection
Normal Key pin "NO"	Brown	N key input Screw terminal
Auto Key pin "NO"	Green	A key input Screw terminal
Pursuit Key pin "NO"	Yellow	P key input Screw terminal
GND	White -> painted to Black	GND power input screw terminal

## Sub Assembly 3

Two 4xcables between PANP and Voicebox



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

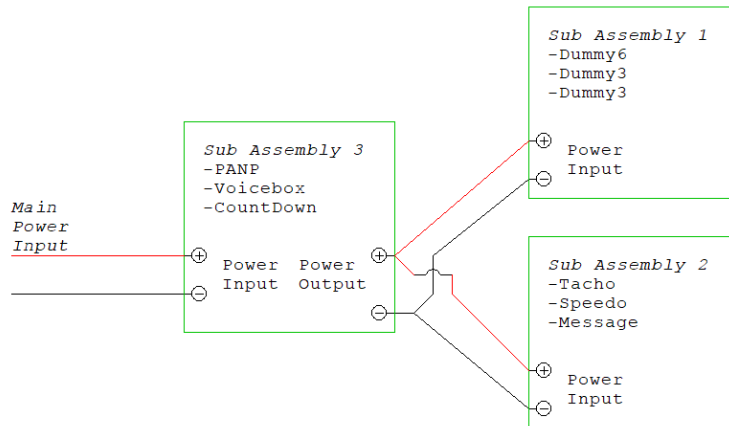
Just route the black and red wires power inputs:

- 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]

### Connecting Sub Assemblies Together



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 "the next wire" you know which wire was guilty.

If you attach everything together before testing, you're lost at knowing which connection is 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>

