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## Instructions How to Build a 5 V 2 A voltage source for the GSM 2G-function of the JouKo Countryside Control Unit device of the JouKo project.

The axial components are soldered to a Cyfronica UM-9 soldering board that has ready 1 mm holes. The board is cut in two at 76 mm from the edge which has the text CYFRONICA UM-9. 26 rows of soldering holes remain perpendicular to the text.

**See the picture JouKo 5 V Source Soldering Picture 1.**

We now place a coordinate system to the originally round and intact metallic soldering points. The highest point ( Ref. Picture ) on the left is the point ( x,y )=( 1,1 ) and the lowest point on the right is the point ( 26,25 ). JouKo 5V Source Soldering Picture 1.pdf

**Modification of the board :**

1) remove the metal from right side of the point rows y = 8 and 9 left of the continuous metal line
2) remove the metal from the right side of the point rows y = 17 and 18 left of the vertical vertical metal line.
3) Remove the metal from the points (20,17), ( 21,17) , ( 20,18) and (21,18).
4) Remove the metal from the points (20,9) and (21,9).
5) Drill two 4 mm holes to the points 8 mm right of (26,24) and (26,3).
6) Drill a 2 mm hole to ( 16.5, 24 ).
7) Drill a 1.5 mm hole to (12.5,21)
8) Drill a 1.5 mm hole to (16,21)
9) Drill a 1.5 mm hole to (13.5,6)
10) Drill a 1.5 mm hole to (17,6)
11) Drill a 2 mm hole to ( 19,3).
12) Drill a 4 mm hole to (11,2).

Press the switched mode power supply module IC1 to the holes of the phases 7) -10) above.
to the non-metal side of the UM-9.The pins AC are lower in y than the +V pin.

**Refer now to the file Document_JouKo DC Source**.
Take a 52 mm long insulated multi-thread copper wire of 1.5 mm2 and solder
it to (13.5,6) IC1 pin AC/L and to (4,21).

Take a 45 mm long insulated multi-thread copper wire of 1.5 mm2 and solder
it to (12,21) IC1 pin -V and to (25,8)

Take a 26 mm long insulated multi-thread copper wire of 1.5 mm2 and solder
it to (16,21) IC1 pin +V and (25,21)

Take a 30 mm long insulated multi-thread copper wire of 1.5 mm2 and solder
it to (17,6) IC1 pin AC/N and (6,4)

Take a 50 mm long yellow-green insulated multi-thread copper wire of 1.5 mm2 and solder
it to (8,11) and lead the end through the board hole at (19,3)

Place the components through the soldering board to these positions. Take care that the diodes
D1 and D2 will have right polarity.

| Soldering point | Position | |
|---|---|---|
| b | 2,3 | solder a soldering tower ( 8 mm high ) of the non-metal side to 2,3 |
| c | 4,21 | solder a soldering tower ( 8 mm high ) of the non-metal side to 4,21 |
| d | 2,3 | |
| e | 4,21 | |
| f | 2,3 | |
| g | 2,11 | |
| h | 4,21 | |

| | | |
|---|---|---|
| i | 2,3 | |
| j | 4,21 | |
| k | 9,16 | |
| l | 8,11 | solder a soldering tower ( 8 mm high ) of the non-metal side to 8,11 |
| m | 6,4 | |
| n | 8,11 | |
| o | 6,4 | |
| p | 4,21 | |
| q | 25,21 | |
| r | 25,8 | |
| s | 25,21 | |
| t | 25,17 | |
| u | 25,17 | |
| v | 25,8 | |
| x | 25,18 | solder a soldering tower ( 8 mm high ) of the non-metal side to 25,18 |
| y | 25,8 | solder a soldering tower ( 8 mm high ) of the non-metal side to 25,8 |

The same x,y coordinates for components means that the legs of all components
with the same x,y are soldered to make a contact with each other in the vicinity of x,y. It is possible to use
the near by soldering holes x+-1 , y+-1 to fit the components. However , the soldering material
cannot touch the leg group that has been designated to another x,y pair.

**Xamk is not liable for**
**consequences related to building this circuit or using it.**
**The liabilities are builder's and/or user's liabilities. Only a certified electrician is allowed to build this circuit.**

Take the EMI shield box and place it over the switched mode power supply module.
Attach it to the board at 16.5,24. Use a sharp pointed 2 mm screw.

Solder the "Grounded House Shield " or PE signal yellow/green wire to the EMI shield at 17,3.

Use the 4 mm holes 5) and 12) and 4 mm machine screws to attach a non-copper trial board
of the same size so that it is located 6 mm away from the insulations of the wires

on the metal side of the soldering board.

Attach the double board with the non-metal surface facing the JouKo mother board
and the points b and c on the right hand side. Drill 4 mm holes to the mother board at the 4 mm
holes. Use plastics ( non-conductive ) screws only, because the mother board under the 4 mm holes
has both GND and DC voltage planes inside the board !
Place the non-metal board 2 mm above the motherboard by adjusting the 4 mm nuts.

Do not connect the JouKo device to the mains at this stage. Check and inspect the whole
5V AC/DC circuitry You have built.

Connect the three soldering towers with 1,5 mm2 multithread wires to the points L1 in, N in and
Protective Earth ( PE, yellow-green ) of JouKo. Connect the two soldering towers with 1.5 mm2 wires to
the motherboard points +5V in and GND. The screw connections
carrying mains AC can only be connected by a certified electrician.

Connect the JouKo device to mains, AC 230 V , via L1 in and N in, and also to similar phases 2 and 3 if needed. The power to the AC/DC circuit comes from the L1 in , and N1 in signals of the JouKo motherboard.

**Component list :**

| | |
|---|---|
| Soldering board | Cyfronica UM-9 |
| non-metal hole board | 75 * 65 mm , non-conductive, for a 2-level sandwich structure |
| R1 | Varistor Littelfuse V300LA40APX10 423-517 V |
| D1 | Suppression zener P6KE400A clamping 548 V ON Semiconductor |
| D2 | Suppression zener P6KE400A clamping 548 V ON Semiconductor |
| C1 | Capacitor Vishay F17734102000 100 nF 253 V "X" |
| L1 | Coil API Delevan 4590R-825K 8.2 mH 0.32 A |
| L2 | Coil API Delevan 4590R-825K 8.2 mH 0.32 A |
| C2 | Capacitor TDK B32021A3332K 3.3 nF 300 V "Y" |
| C3 | Capacitor TDK B32021A3332K 3.3. nF 300 V "Y" |
| IC1 | SMPS Mean Well IRM-10-5 ( SMPS AC/DC 5 V 2 A out ) |

| | | |
|---|---|---|
| L3 | Coil Bourns RLB0608-1R0ML 1 uH 1.03 A | |
| L4 | Coil Bourns RLB0608-1R0ML 1 uH 1.03 A | |
| C4 | Capacitor Illinois 474MWR050K 0.47 uF 50 V | |
| EMI shield box for the SMPS | T:mi Reijo Hujanen 46*26*23 mm ( Cu 0.5 mm ) | Contact info in a separate document. |