

## JouKo documentation

### Modifying the **raw device** coming from our schematics and printed circuit documentation and machine soldering

The JouKo manufacturing documents describe the version “ 0.8 ” and the documents **are not perfect**.

This document describes what **modifications are necessary** right after soldering.

1. The secondary side connection of the mains transformer must be modified. The 2 coils of the secondary side cannot be connected in series as in the schematics. Instead, both secondaries must be individually connected to the two 4x diode bridges. You can find a point on the printed circuit board that must be CUT to achieve this right circuit. The cutting place is marked with X in the file Necessary modification ... TR1 pin 6 is then connected directly to D7 and the TR1 pin 7 is connected directly to D8.
2. The schematics has drawing errors related to two diodes. The internal order of two diodes is different than the pcb design assumes. The two diodes must be modified manually. The diodes D9 and D10 must be turned 180 degrees. See file Necessary modification...
3. The diode block D14 must be modified. Take the D14 away. Replace it with 3 pieces of 1N4148 axial diodes as described in the file Necessary modification ...
4. The diode block HS2D01FU in the schematics should read HN2D01FU . The same typing error is in the Bill of Materials.
5. Note : the large Cu area of the layer Routing Bottom is connected in the pcb to the layer 2 GND signal. This is necessary to know when the 4 mm metallic screws of the 5V source of the Countryside Control Unit device go through the pcb. The screws CAN connect these two layers without problems.
6. The type of power relays is Hongfa HF14FW/012-ZT . This relay DOES NOT contain Cadmium.
7. The antenna type of the City version ( LoRaWAN ) is Linx AntennaFactor ANT-868-PW-QW-UFL .

8. The resistor R93 must be replaced to be 5.0 kohm. It is originally 10 kohm. You can also add a 10 kohm resistor to be parallel with the original R93.
9. The PIN40 of Raspberry must be connected with an extra wire to the point RASPBERRY\_LED.
10. The PIN22 of Raspberry must be connected with an extra wire to the point INTEGRITY. The INTEGRITY signal is related to our cybersecurity check of Laird.
11. The PIN6 of Laird must be connected with an extra wire to the point +3.3V .
12. The regulator U6 must be equipped with a metallic heat sink , of around 2 cm<sup>2</sup> surface area.
13. Only for the City version ( = LoRa ) : There must be either a short circuit or a zero ohm resistor at the place of R22.
14. Only for the Countryside Control version ( = GPRS plus BT Master ) : If there is no resistor at the place of R23, make a short circuit there or add a zero ohm resistor.
15. Only for the Countryside Switcher ( = BT slave ) version : If there is no resistor at the place of R23, make a short circuit there or add a zero ohm resistor.
16. Check that C39 is soldered.
17. Check that C40 is soldered.
18. The pcb has a connection point +5V ( the one not related to the SIM800 IC ). Remove the connection from the pcb to the Raspberry GPIO pin 5V. This can be done by removing a surface mount fuse from the board. Take a half of a USB cable and connect the internal USB wire 5V to the +5V point of the pcb. Plug in the USB cable to the Raspberry. Now Raspberry gets power through the USB cable, not through the GPIO connector.
19. Only for the Countryside Control version ( = GPRS plus BT Master ) : The original AC to 5V separate voltage source “TooGoo” is not used. Build instead the described 5 V source using the IRM-10-5 SMPS module.
20. When testing : do not connect USB auxiliary devices that have an own connection to the house mains zero or ground. Use “AC is floating or battery operated” USB devices only.
21. When testing : do not connect HIGH POWER INPUT USB devices such as an optical mouse to the USB port of the Raspberry. The internal 5V source cannot deliver enough current to high power input USB devices.

22. Note : The GND signal of the JouKo device is **floating** related to the house zero or ground. If using an oscilloscope of measurement device that is mains operated, provide a galvanic separation from the measurement device to JouKo, or use a battery operated measurement device. Otherwise You force too quickly the JouKo GND signal to rush to the house zero level. If the JouKo GND was originally at e.g. +30 V, then the logic signal of JouKo is at +33 V. Now You would cause the JouKo GND rush to 0 V, but the logic signals are still momentarily at +33 V !