

CRuni-NG for ICOM IC910H

Installation and modification guide

(Last revision: 24/05/2024)

CRuni-NG high stability frequency reference for Icom IC910H

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Introduction

The CRuni-NG is a programmable high stability synthesizer unit, based on a Si5351 CMOS synthesizer with a high stability TCXO as reference clock. It's designed as a replacement for many ICOM's OCXO crystal units, like the ICOM CR338, CR282 and CR293 OCXO crystal units used in many ICOM transceivers.

The installation on a IC910H required a small modification to pick up the supply voltage on a different point, to solve the problem with the critical startup timing between the Cruni-NG and the DDS on this transceiver. Furthermore this modification has also the advantage that the CRuni-NG always remains powered even when the transceiver is switched off and therefore does not require a run-in time when the IC910H is switched on.

Warnings

Disclaimer

This module is made exclusively for radioamateur and educational-experimental use. As a result, it should be assembled and used by an expert with experience in the assembly of electronic circuits.

We do not accept any responsibility for bodily or material damage caused by the construction and use of this assembly box. As a result, assemble and use this kit at your own risk.

The operation may not be guaranteed, and even less so its eligibility for use of certain applications. The user should verify its applicability for their own applications and is responsible for the latter.

Errors of access and use are factors that are beyond our control, we are therefore not responsible for bodily or material harm caused by these errors or inexperience.

The guarantee applies exclusively to the individual parts (on the condition that these are assembled correctly) and not to the assembled product. The aforementioned RF-SYSTEM reserves the right to make modifications and/or improvements to the module at any time, without updating this manual.



Before installed in a transceiver, the solder jumper SJ1 must be configured correctly.

Incorrect configuration of this jumper may cause damage to the module and/or to the transceiver.

- It is advised that the parts are kept out of reach of children and away from pets, as they are a choking hazard.
- Do not inhale the fumes from the welding. Use a filter or device to remove these from the work station.

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- Aerate the room after the welding activity.
- When using a soldering iron, place it down only once the rod has cooled down properly.
- Do not solder on powered live circuits.
- Carefully follow the instructions provided in this manual.
- In case of any doubt concerning the procedures to be followed, seek technical assistance.
- Do not try to modify the parts of the circuit that have already been assembled.

Before beginning

The installation procedure of this module may be facilitated by certain small steps:

- Organise the work space for the procedure.
- Preferably use a wooden table with a sheet of antistatic map placed on top to prevent any parts that may fall from bouncing to the ground.
- Keep the necessary tools within arm's reach.
- Use a soldering iron whose tip is in good condition. Eventually change it as a preventative measure.
- Use a free solder alloy for electronics possibly without lead.
- Preferably use a rigorously earthed antistatic bracelet connected to through a resistor of 1 MegaOhm.
- Rushing is bad practice! Proceed with the most calm approach possible!!!

Soldering advice

For the assembly of the kit, no particularly sophisticated soldering equipment is necessary. Even with a good pen soldering tool (at least 30 watts of power) you can obtain optimum results. The key point for successful soldering is certainly the state of the tip. Damaged tips or tips which have lost the silver surface layer should be replaced. The tip, once heated, may be effectively cleaned by melting a small amount of solder alloy on it and then passing it repeatedly on a damp sponge (not soaking). The operation of cleaning with the sponge should be repeated regularly, in order to eliminate residues of fluxing and oxidising agents that may build up on it.

Preferably use lead-free solder alloys, even if the soldering in this case will not have a very shiny appearance and may as a result be more difficult to complete. The diameter of the alloy to be used simply depends on habit. Taking into account the "step" of the parts to be soldered, a soldering alloy with maximum diameter of 1mm should be entirely sufficient. Larger diameters may be difficult to manage, and smaller diameters may require more wire feeding during the fusion operations. One should not use fluxing agents or soldering pastes since modern soldering irons have a core that, upon melting, carries out the same function as the soldering paste.

Soldering operations should be carried out in a fast and decisive manner. Certain components (such as crystal) do not increase in size such that their leading wires must be insisted upon with the soldering iron. The same is true of the transformers. The soldering alloy should never be liquefied on the tip of the soldering iron, but on the leading wire of the part that is being soldered, following the heating of the same. After the fusion has begun it is necessary to apply the heat for several moments (1 or 2 seconds) so as to complete the fusion of the deoxidising agent and to guarantee optimal electrical contact. Do not exaggerate the quantity of tin that is melted on the leading wires, excesses tin may result in aesthetically awkward soldering or in short-circuits with the adjacent feet.

Once the soldering phase is complete, one should never blow on the soldering alloy. The cooling should take place slowly by convection.

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Particular attention should be paid to the airtightness of the ground planes. In this case the large metallic surface has an elevated thermal capacity, and it may therefore be difficult (especially if the soldering iron is not overly powerful) to produce good soldering results.

Also in this case it is only a question of time, keeping the tip on the ground plane for a few seconds, such as to lightly heat it and then proceed to the use of the soldering alloy.

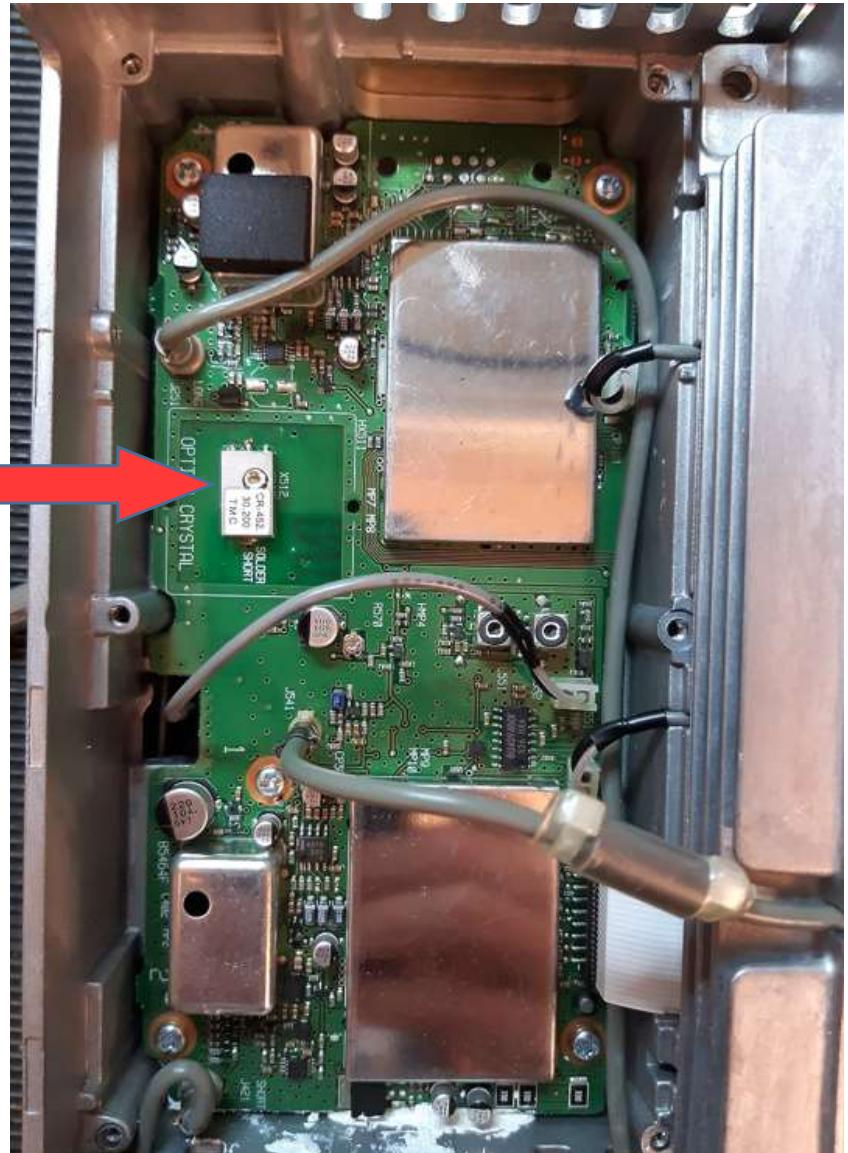
If an error is made, the excess tin may be removed with a desoldering braid (make sure it does not touch your fingers too much) or with tin remover (electrical or pump). The parts should be removed only when the soldering alloy has been correctly removed and without exerting too much force in the extraction. If the component is “stuck”, remove the tin more efficiently. Applying force with pliers or wire cutters may lead to insoluble damage to the printed circuit.

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Preparation and setup

The pack containing the CRuni-NG module has finally arrived, so, remembering what was said in the first section, the necessity is for a space that allows us to work comfortably and calmly.

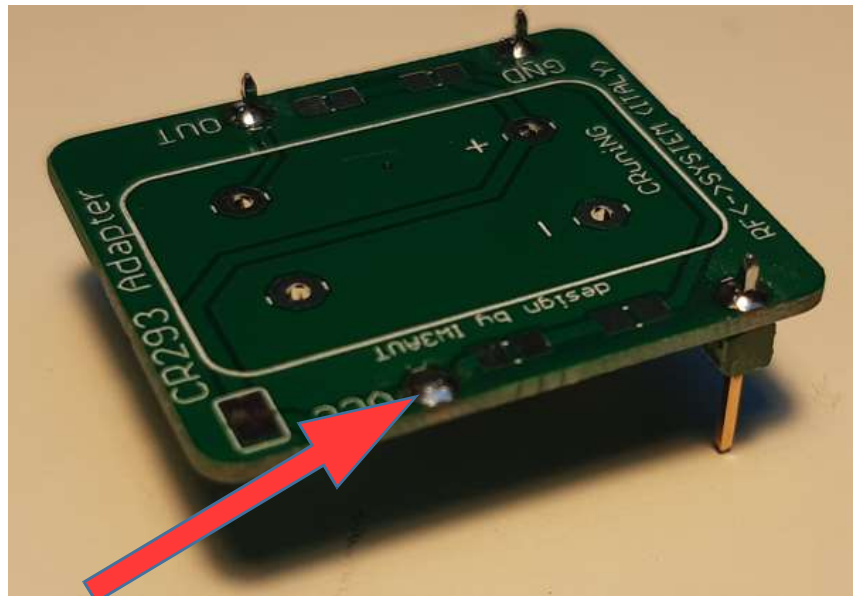
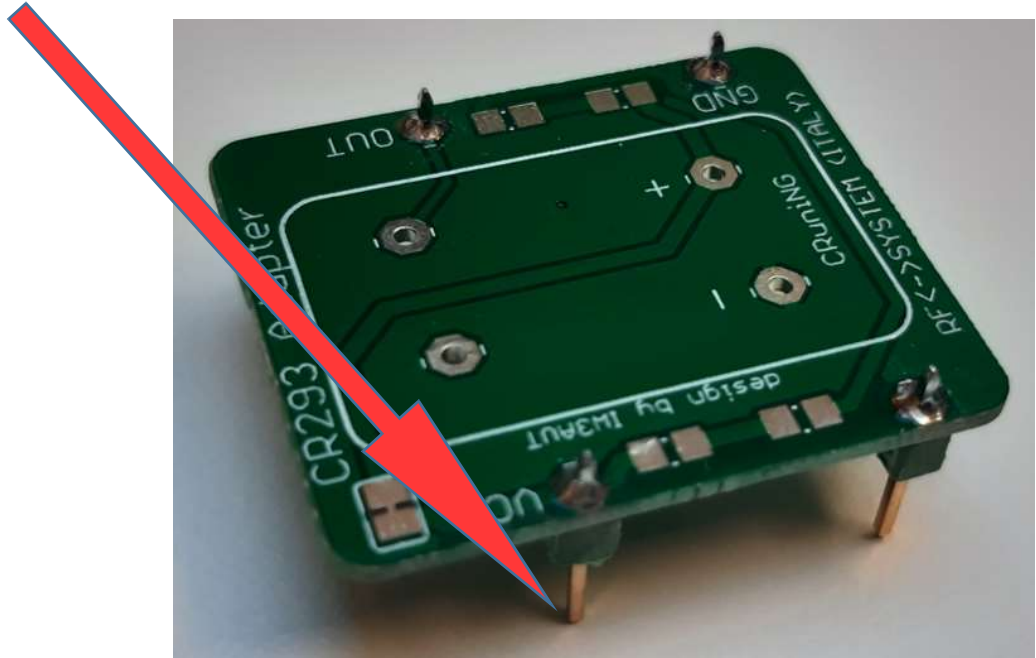
First of all, remove the bottom cover of your IC910H and locate the stock crystal unit CR452:



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Installation

Desolder and remove the "VCC" pin header from the adapter board:



Solder a piece of red wire about 20cm long on "VCC" solder pad

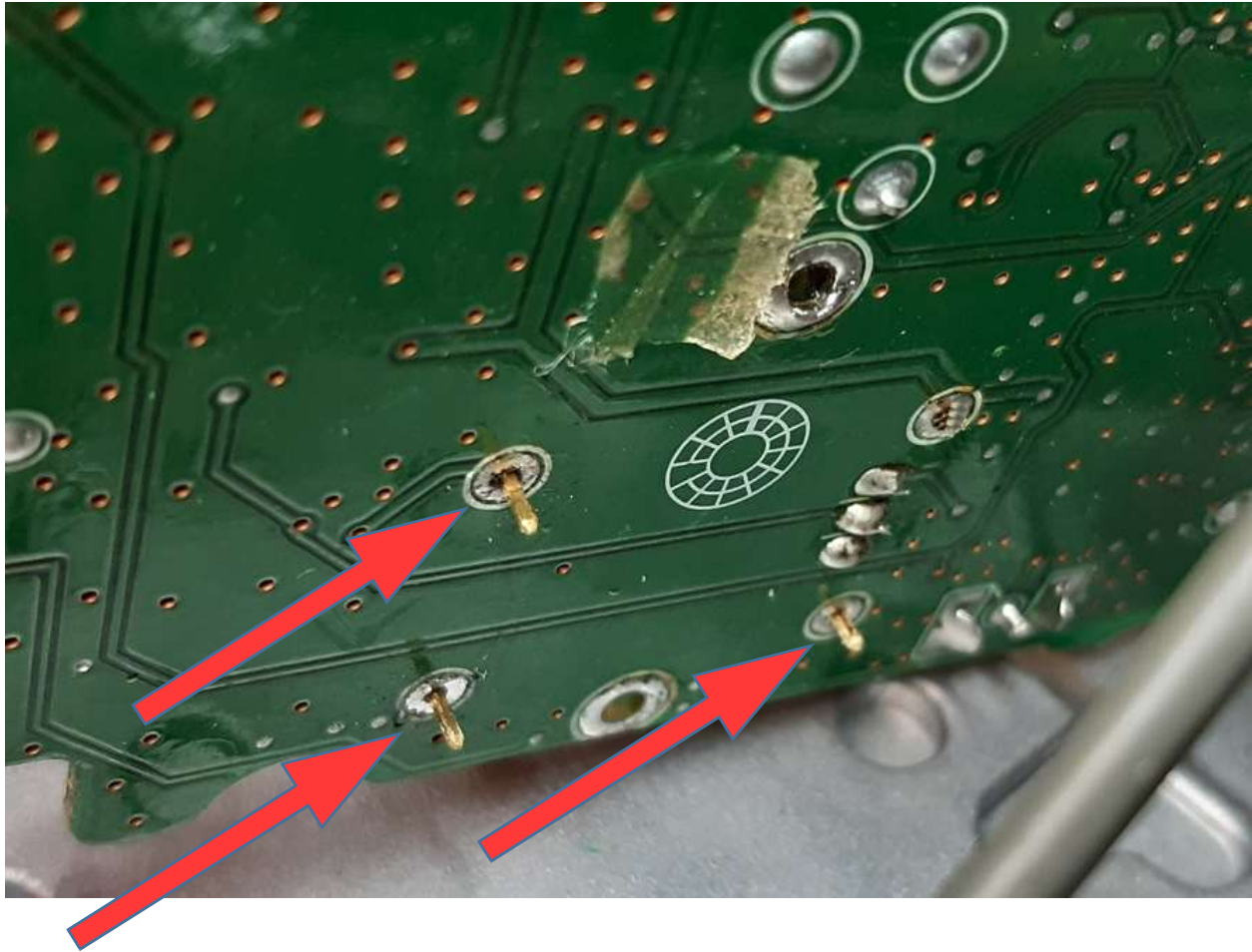
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Desolder and remove the stock crystal unit CR452 and place the CruniNG:



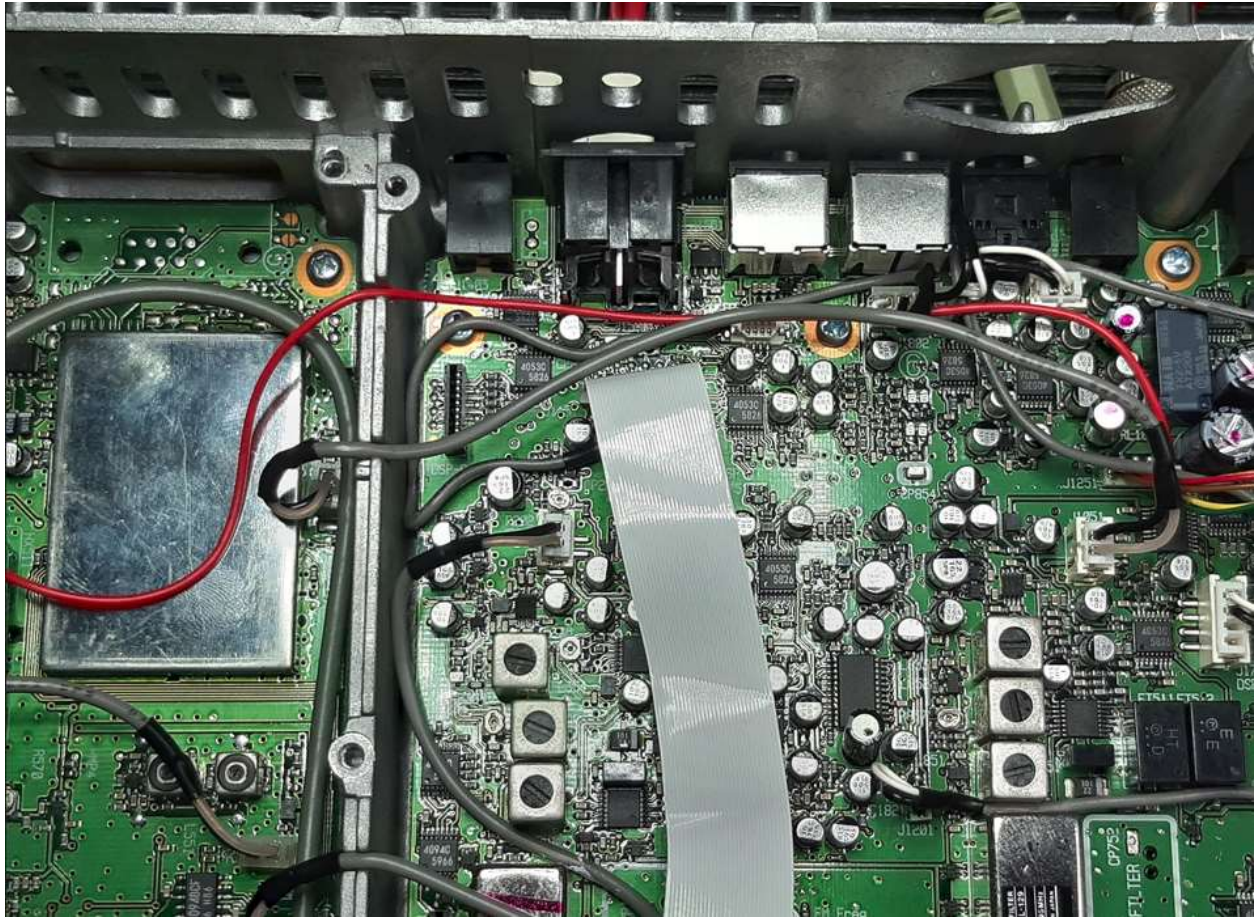
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Solder all 3 pins on the bottom side of the PLL Unit:



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Route the red wire to the MAIN UNIT and solder it to pin 5 of J1251:



Route the red wire to the MAIN UNIT and solder it to pin 5 of J1251:

