Patching IKEA TILREDA for auto control

Purpose of this document

The purpose is making a guide to use an external logical signal to control on/off state of the desktop induction cooker.

In order to setup a cost effective regulation system for beer making, knife making or other activity calling for automatic temperature control.

Link to IKEA induction cooker

Disclaimer

When opening and changing the function of the cooker, there is risk of shock. Therefore always turn power OFF when having the cooker opened up.

All modifications is done at own risk, this information is for educational use.

This is not a comprehensive guide how to patchup Auto mode, it is a high level description including some helpful pictures. Electrical knowledge of circuits and safety is required.

Overview and scope of patchup

The Scope of the project is to make a switch between two modes:

- Normal mode, the cooker works as originally designed/intended
- Auto mode , controlled from outside voltage on or off.

The cooker uses an integrated IC chip (HIGHWAY09 16pin DIL) to generate the 20khz clock signal , that control the heating element (via FETs). It has proven difficult to manipulate the IC control loop for Auto control.

Instead the HIGHWAY09 20Khz output was disabled, and a custom designed 20khz clock source added, that have an enable pin accessed from outside of the product.

Patch was done via cutting the pcb track going from pin3 (HIGHWAY09) (Clock output to FET's)

For AUTO mode to work properly, two more patches is required:

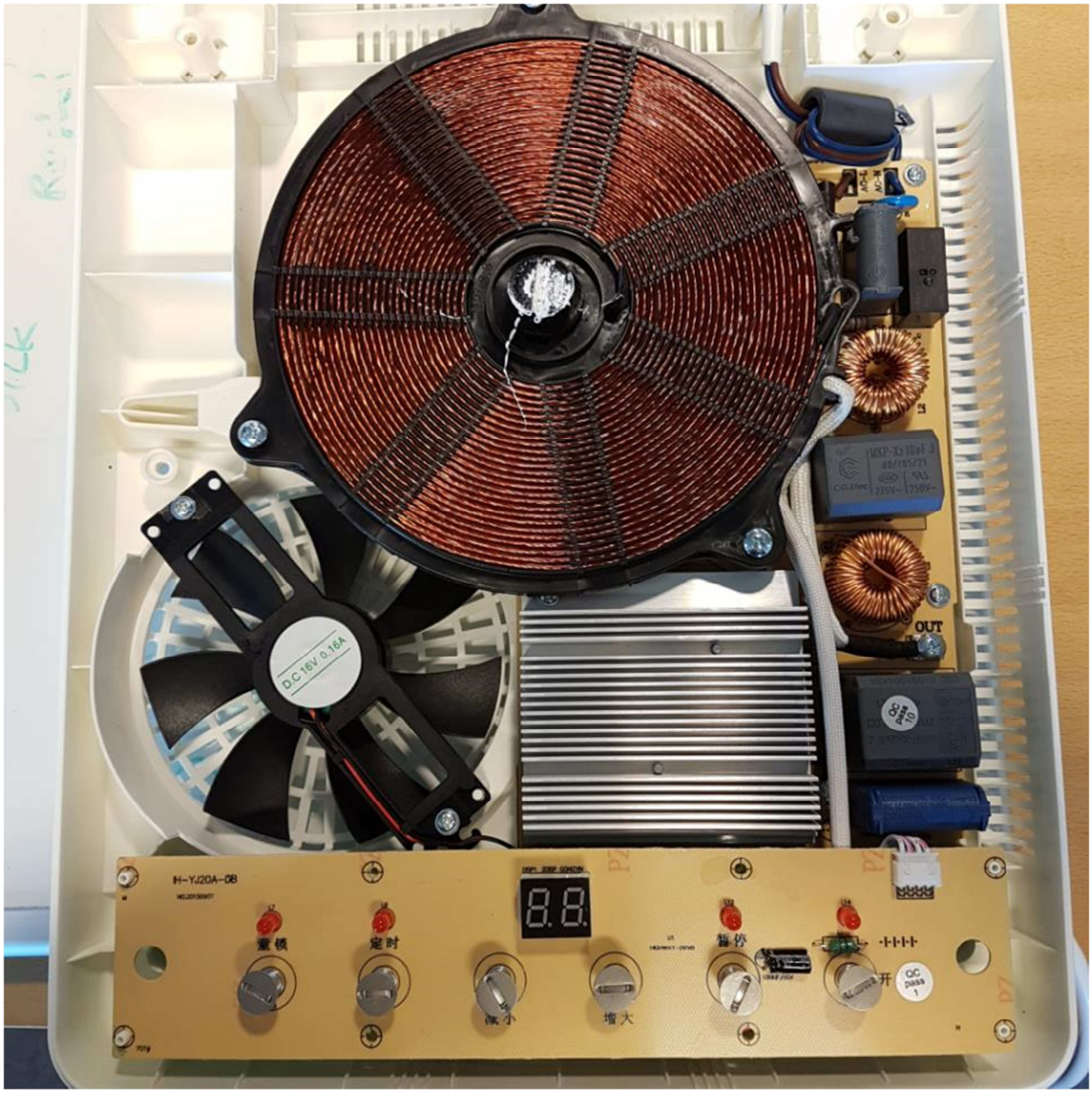
1. the internal power relay shall be bypassed (normally controlled by HIGHWAY09 IC)

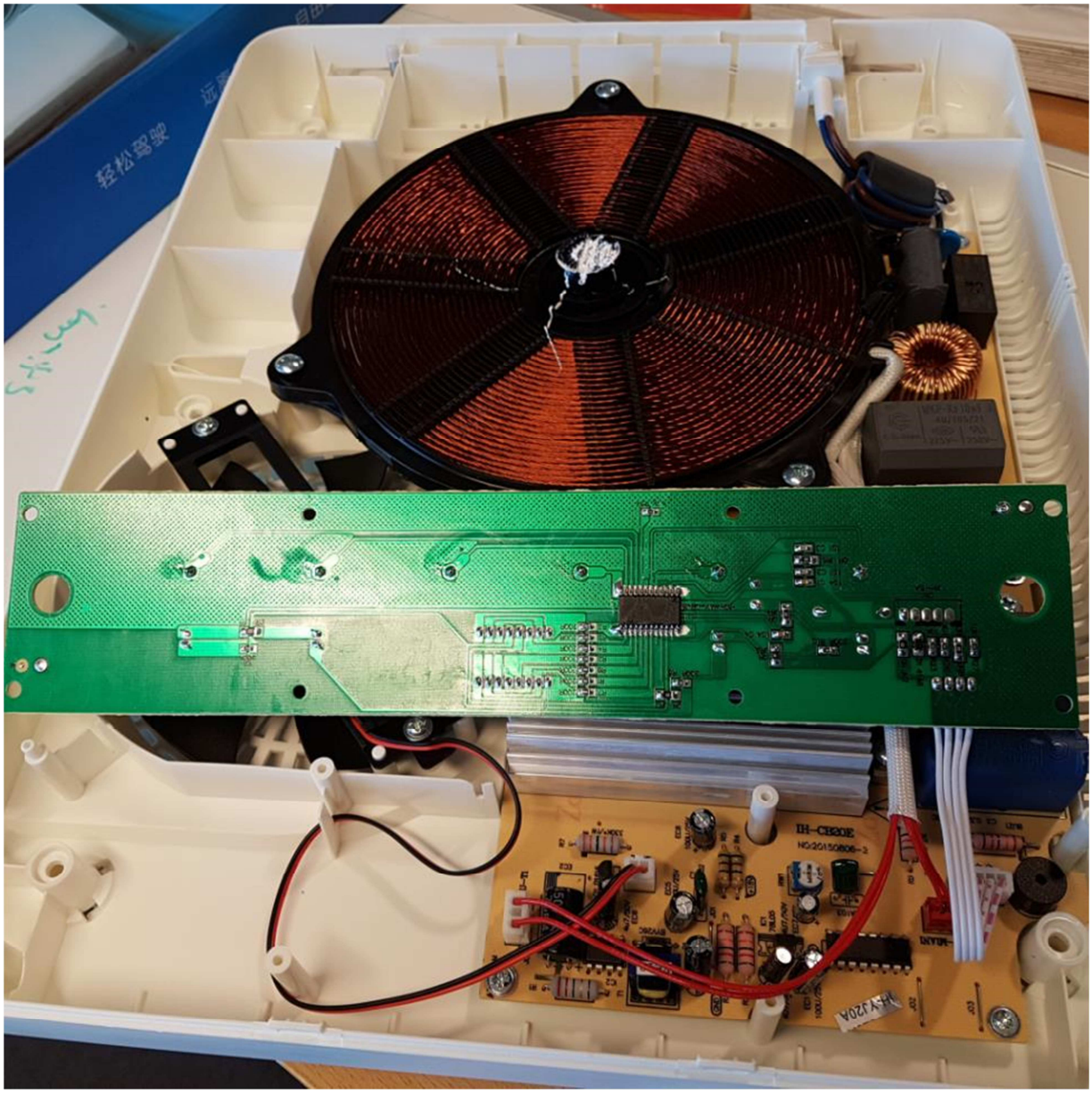
   when the cooker is turned ON (via touch panel) the standby circuit activates the power relay.

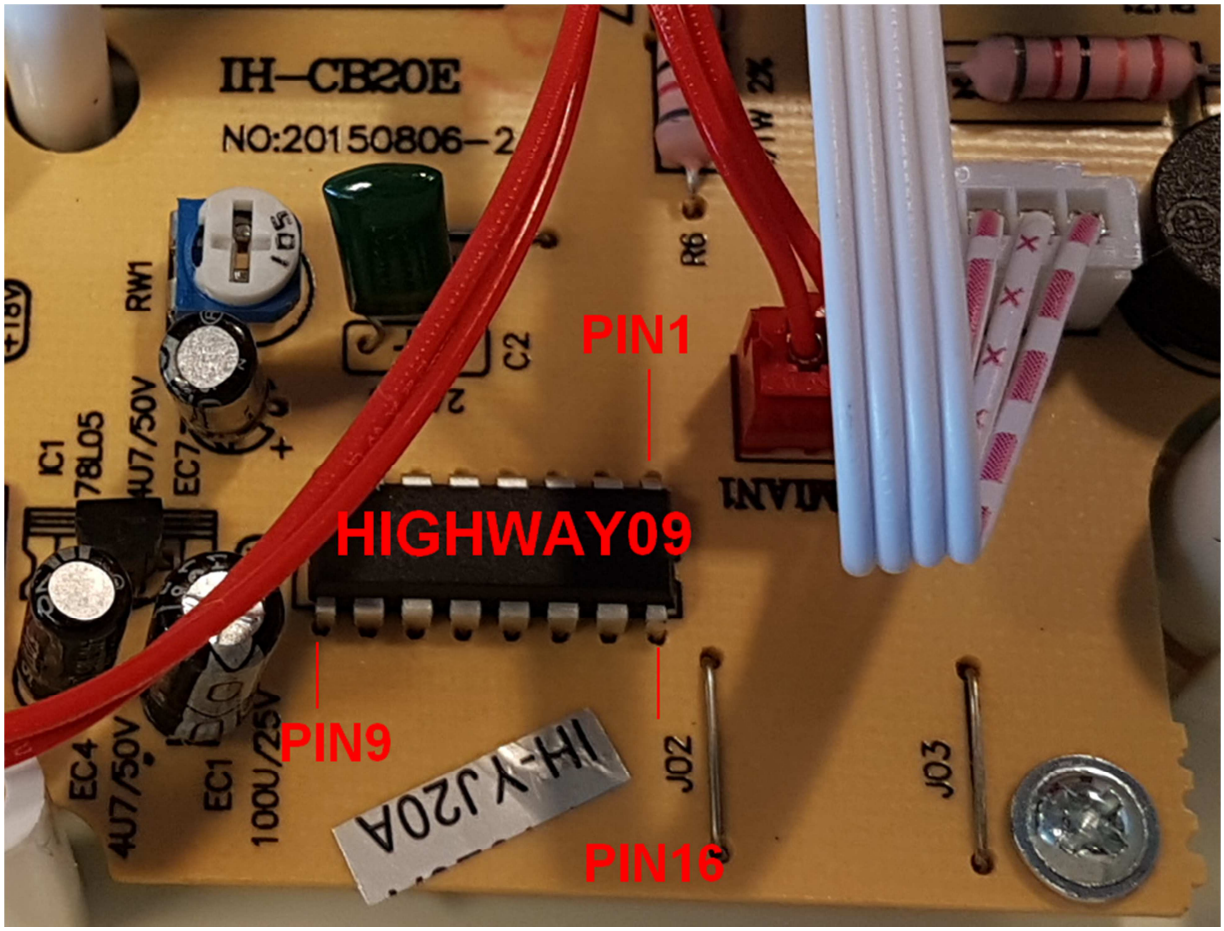
2. The FAN is set to always ON when in AUTO mode, to avoid cooker from overheating.

HIGHWAY09 PIN FUNCTIONS:

PIN Number	Type	Function
3	Output	Clock signal 20Khz/5V controlling Induction heater element, active high
4	GROUND	Ground
10	Supply	+5V
15	PIO	FAN/BUZZER control, active High


H-YJ20A-08
童锁
定时
减小
增大
暂停
开
QC pass 1
OUT
DC 16V 0.16A


轻松驾驶



Note the LM7805 voltage regulator left to the HIGHWAY09 IC, It will be used to power HIGHWAY (Normal mode) or power the FAN constant on (Auto mode).

Opening up the cooker

Screws are under 4 pcs. rubber feet. Some force needed to remove top of cooker.

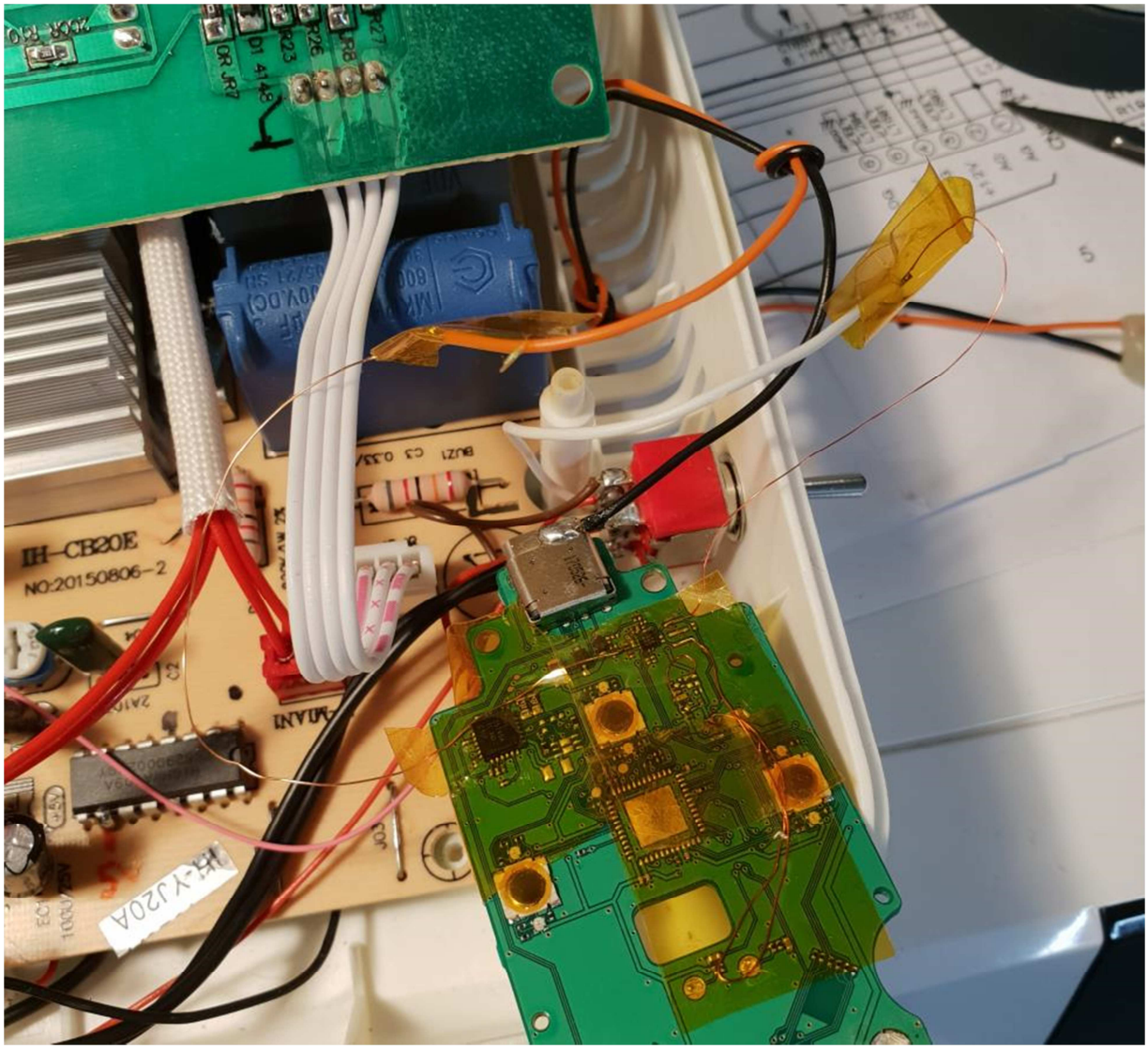
Patch up

Get the main board out and study the block diagram to identify changes needed. A double throw switch can be mounted on the right side of the cooker to control the Normal /Auto mode.

Cooker can be modified in permanent Auto mode – if it is never to be used as a manually controlled cooker. Depending og how much effort that needs to be spent.

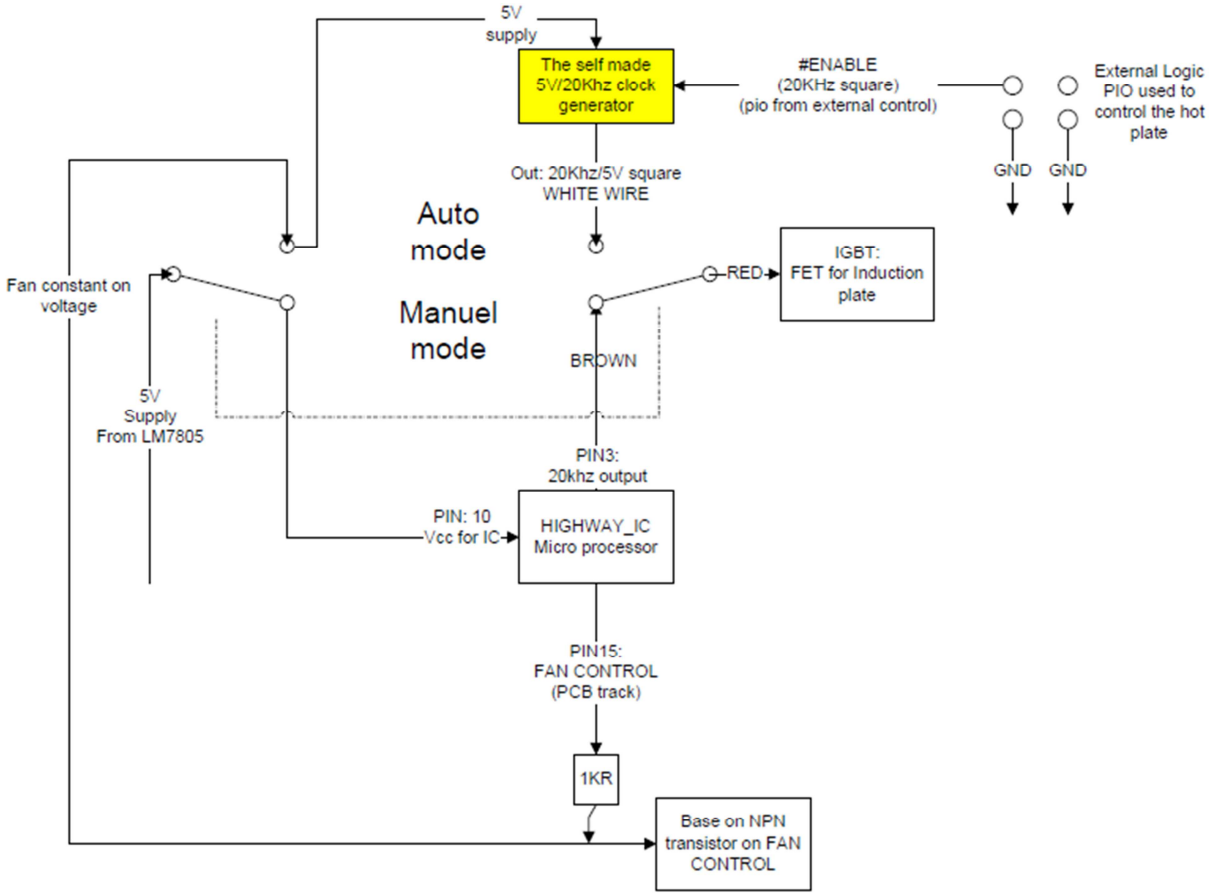
The external Clock signal 20Khz/5V board , can be placed on the side of the product – and wired back to the main board. So it shall have a reasonable size to fit in the cabinet.

Below is shown an early test setup of the whole external clock circuit, the switch on the side of the cooker and the temporary wiring. When I got it working it was done in a more robust way. And glued the clock pcb onto the space below in the picture.



Block diagram

Note: double switch used



Remember:
For Auto mode:
Patch Power relay to Active is
needed to allow power to cooker
when HIGHWAY09 IC is disabled.