

8kHz OCXO

Written by Hans Summers

Friday, 04 September 2009 21:35 -

OCXO General



Here are some pictures of the OCXO. Left: assembled; Right: Disassembled! The unit was produced by Fujitsu Limited. It is very nicely engineered. Inside filling the crystal enclosure are a large quantity of tiny glass beads, a small number of which inevitably escaped onto my kitchen floor. That was a good enough excuse to sweep the floor, and it is believed that a high proportion were recovered from the resulting dust pile.

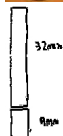


The end-plate (see right) indicates that the oven temperature is 60C, and the supply voltage 21/24V DC at 8W. The incription on the side reads, in both Japanese and English:

CAUTION

1. Handle with care
2. Rustling inside when tilted is no trouble

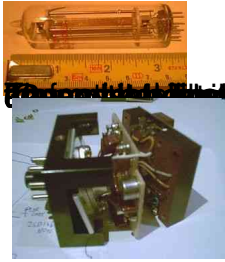
The "rustling inside" refers to the movement of the glass beads, which would indeed cause no trouble...



Crystal

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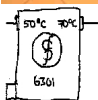
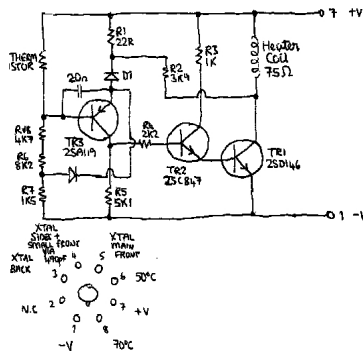


Controller

The controller is near the base of the oven. It is a small PCB containing two transistors. The third, power transistor, is located on a small aluminium heatsink between the PCB and the octal base. See picture, right.

I traced the circuit diagram of the controller and it is drawn below along with the pinout. The metal box around the crystal enclosure is connected to +V. Note that the whole oven is encased in black plastic (bakelite?).

The heater coil is wound around the metal crystal enclosure and its resistance was measured as 75 ohms (cold). The thermistor is cemented to the metal crystal enclosure. At room temperature I measured its resistance as 69K. I placed it in front of a 2KW electrical domestic heater for a few moments and watched as the resistance fell to below 25K, before my hands got too hot. The diodes are glass types, they look like germanium diodes but the forward voltage drop indicates they are actually silicon. Note that all the 4K7 resistor is indicated on the PCB as "RV8", as opposed to the others R1, R2 etc. I am unsure what this means. Is it also a thermistor?



Temperature Switch

Fixed to the inside of the metal crystal enclosure, near the opposite end to the crystal base (i.e. near the TOP of the oven as a whole), is a strange component. You can see this component in the picture, to the right. Also shown is a diagram showing the markings on the face of this component. Its end bears the number: 4190.

It has three terminals. One is a tab connecting to the component case, which is also the means by which the metal crystal enclosure is connected to the +V rail. The other two terminals are labelled 50C and 70C respectively. I measured zero resistance between the case and the 50C terminal, and infinite resistance between case and 70C terminal. It plays no part in the temperature controller circuit, the two connections (50 and 70C) are brought direct to pins 6 and 8 of the octal plug.

Numerous readers have now written to me about this mysterious component and the overwhelming consensus of opinion is that it is a temperature switch, which could be used to indicate to the user or the circuit using the OCXO, that the temperature of the crystal is in an abnormal range i.e. below 50C, or above 70C.