Surface Mount Assembly
with a Toaster Oven

Mike Seguin, N1JEZ

Eastern VHF/UHF/Microwave Conference 2024

The Problem

1 New/interesting parts are getting smaller

2 Some no longer have leads that are easy to solder

3 They now have pads on the underside of the package

4 And can have a ground pad on the underside as well

Pad can be tied to the die for Thermal management

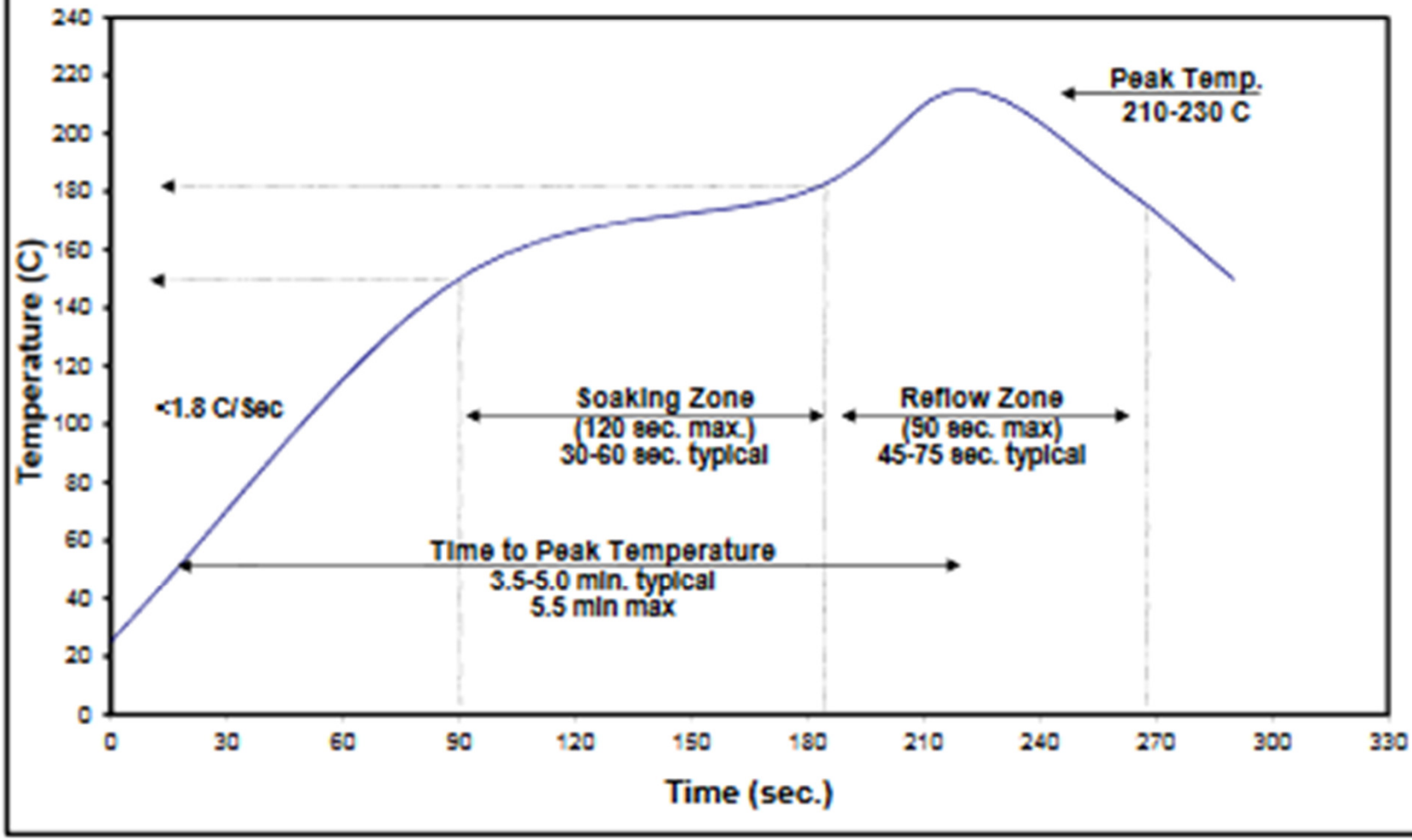
Enter the Toaster Oven!

But how to make it work?

Kester EP256 Lead Solder Paste
63/37 Syringe Dispenser

Refrigerate when not in use

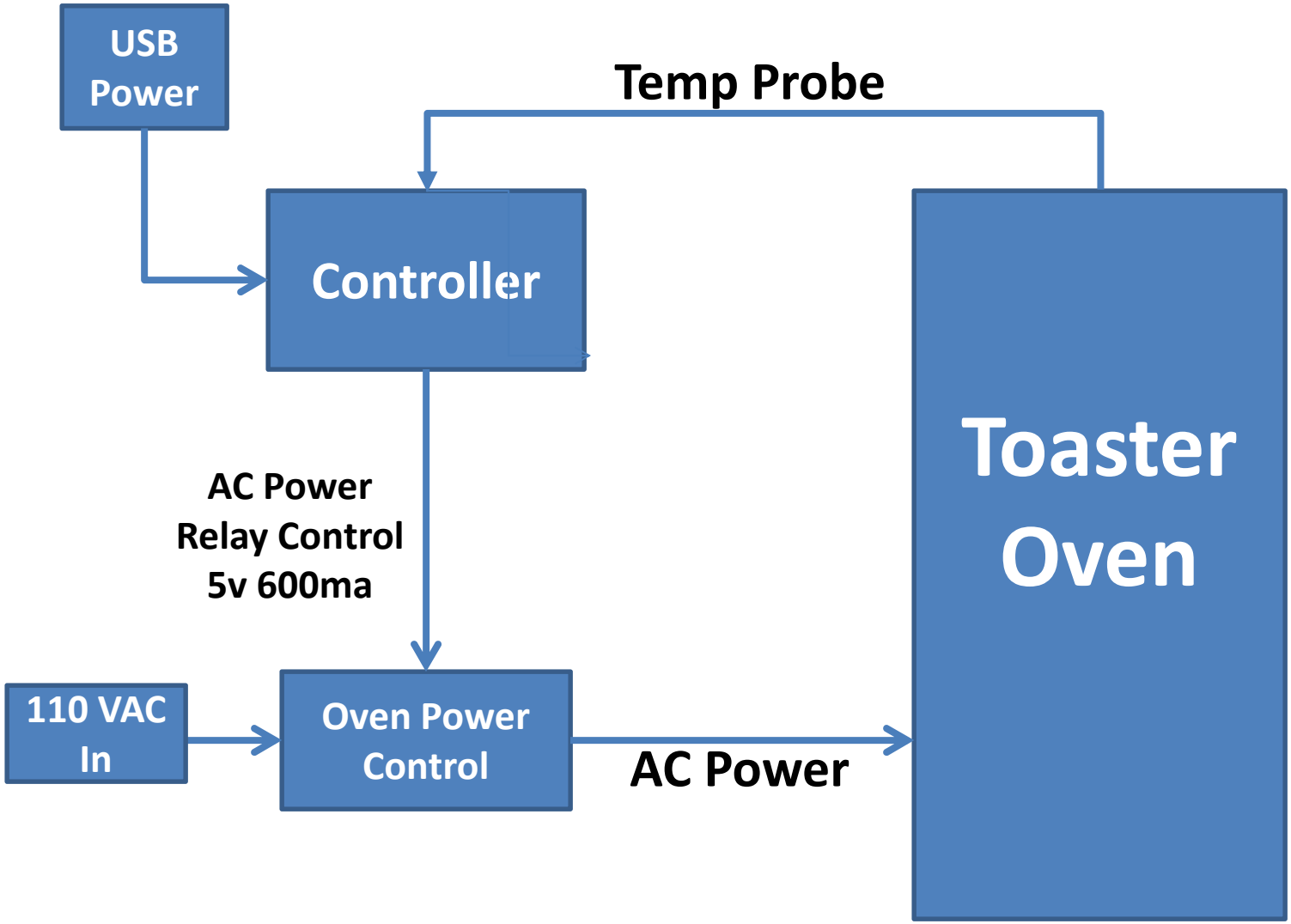
Kester Reflow Profile
Alloy: Sn63Pb37 or Sn62Pb36Ag02

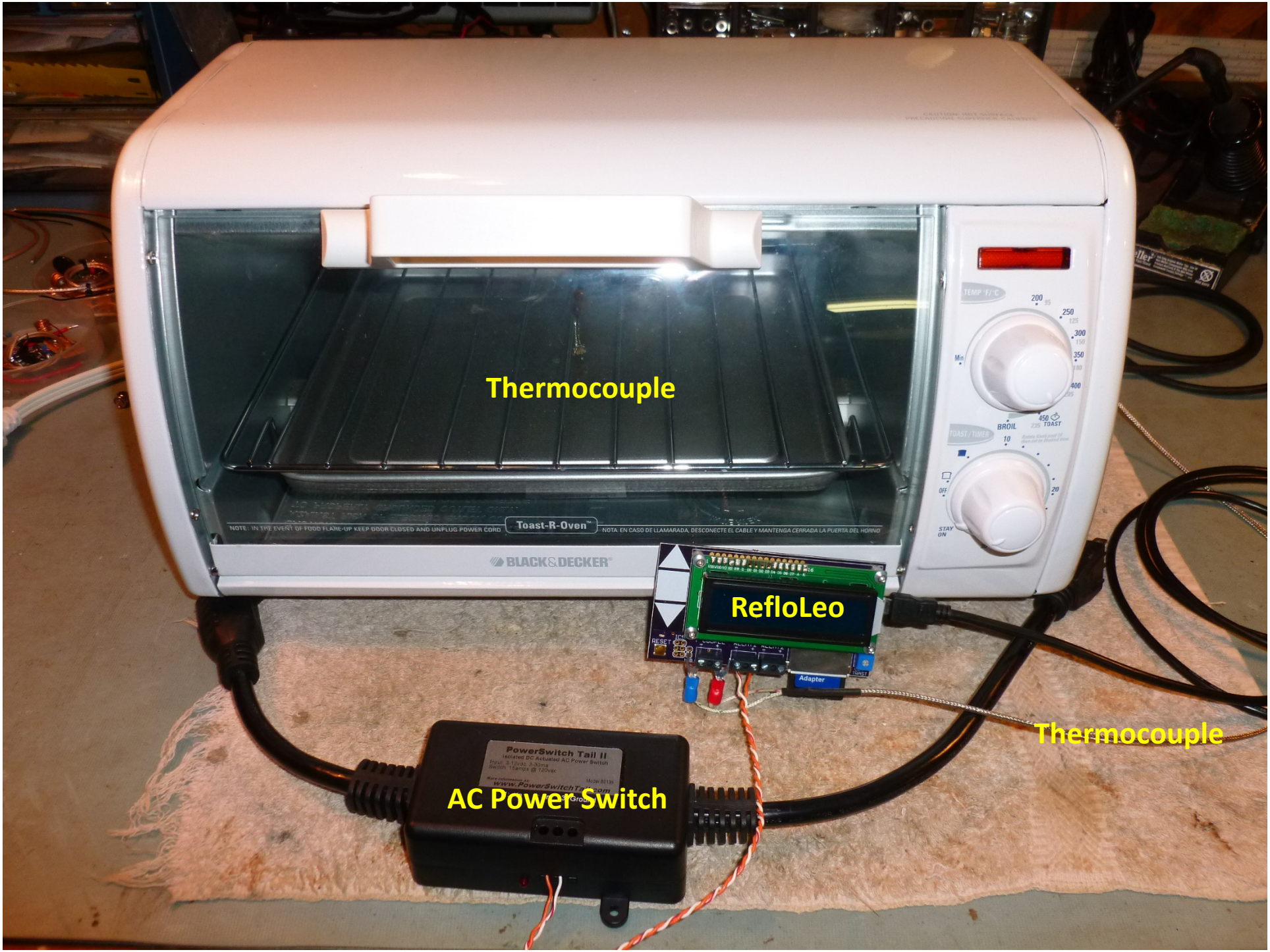


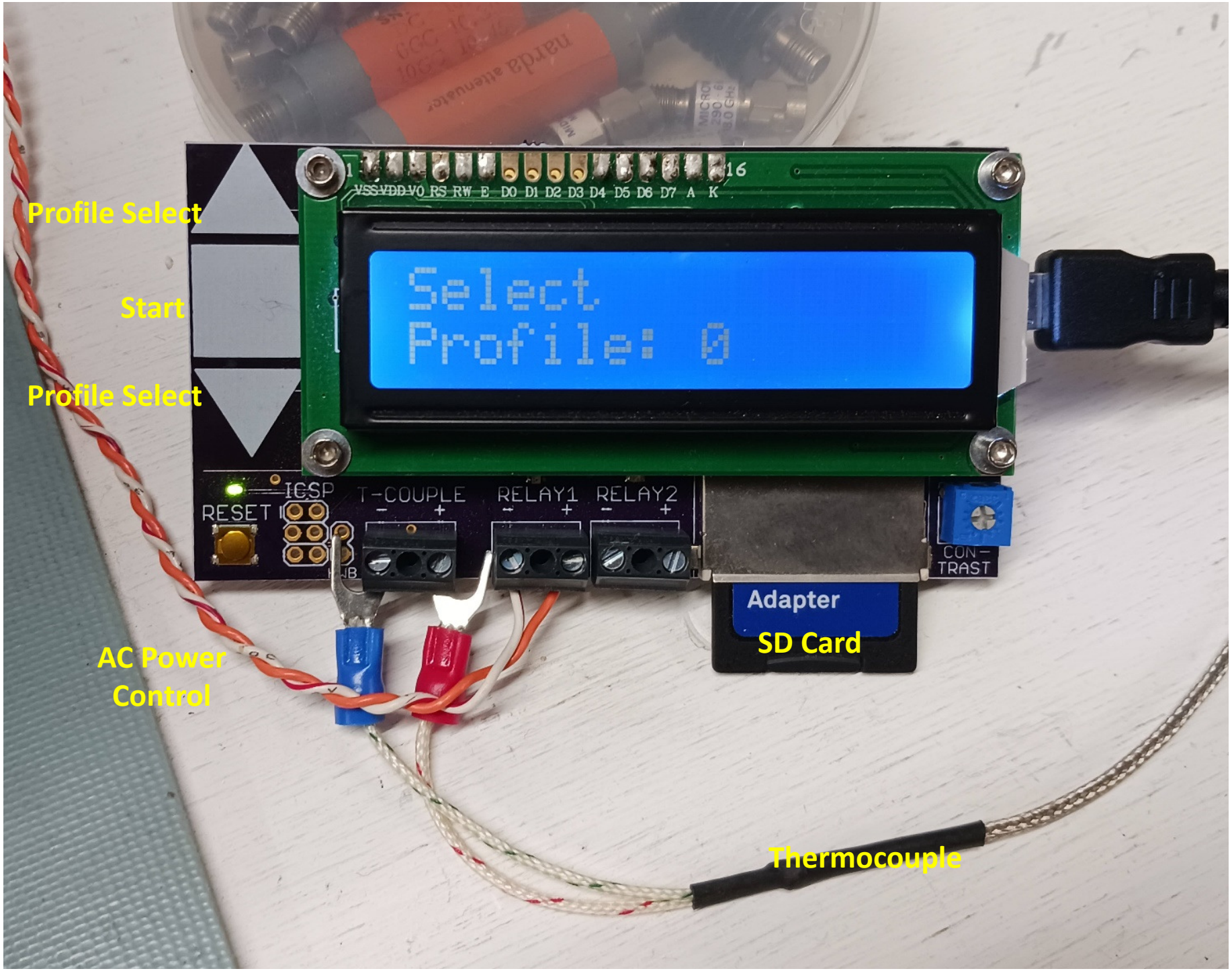

RefloLeo!
RESET
RELAY

- **RefloLeo is a KickStarter project**
- **Arduino Leonardo compatible**
- **K-type thermocouple**
- **USB powered**

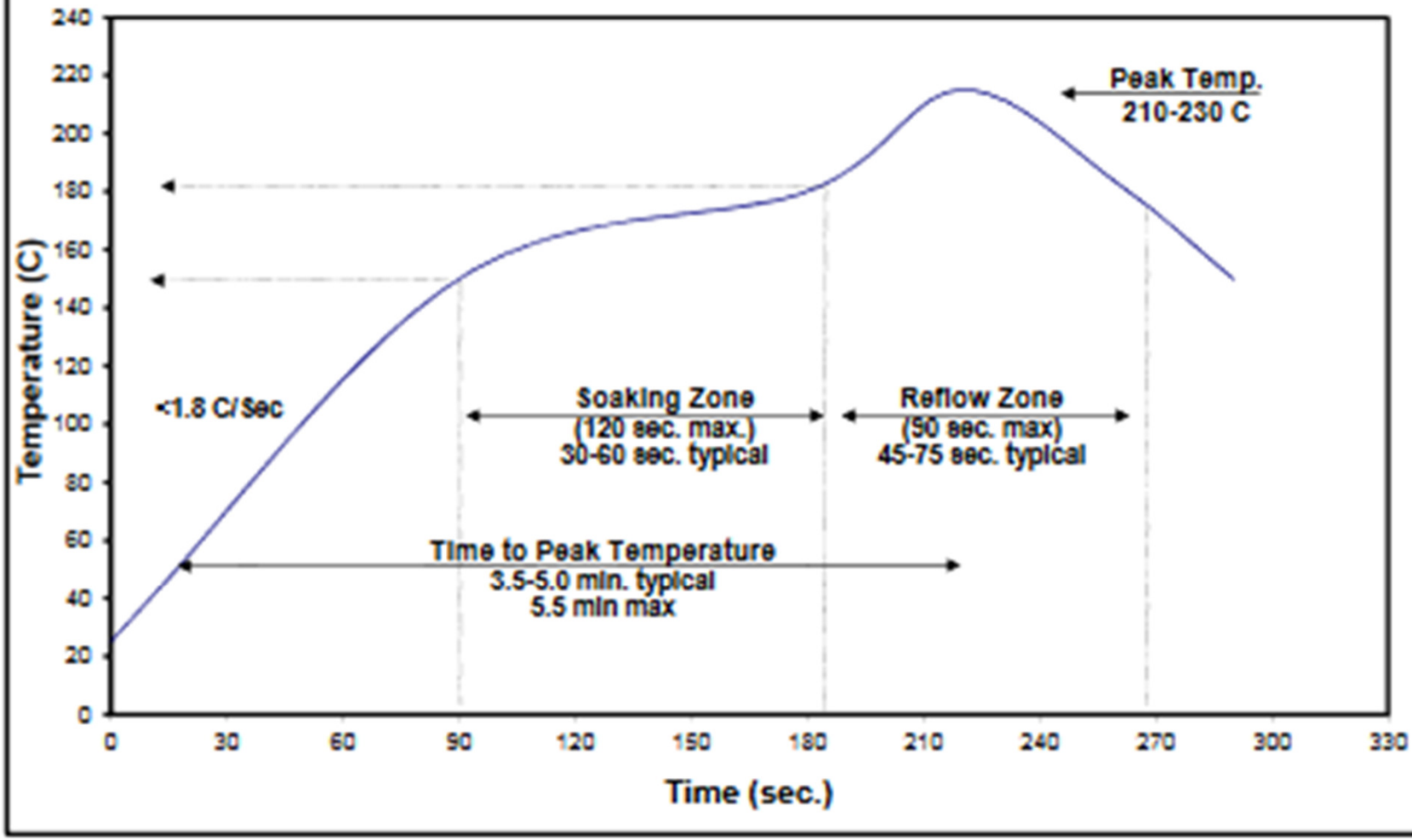
- 5V, 600mA external relay control capability
- SD Card for Profile storage
- Simple setup and operation
- Open hardware design


USB Power
Temp Probe
Controller
Toaster Oven
AC Power
Relay Control
5v 600ma
110 VAC In
Oven Power Control
AC Power


Thermocouple
RefloLeo
Thermocouple
AC Power Switch
Toast-R-Oven
BLACK&DECKER
PowerSwitch Tail II
Isolated DC Actuated AC Power Switch
Adapter


Profile Select
Start
Profile Select
AC Power
Control
Select
Profile: 0
VSS VDD VO RS RW E D0 D1 D2 D3 D4 D5 D6 D7 A K
1
16
RESET
ICSP
T-COUPLE
RELAY1
RELAY2
CON-
TRAST
Adapter
SD Card
Thermocouple

Kester Reflow Profile
Alloy: Sn63Pb37 or Sn62Pb36Ag02



Reflow Profile Command Examples

```
T130,000  Goto 130 degrees

W000,015  Wait 15 seconds (and turn off heat)

H150,120  Hold at 150 degrees for 120 seconds

T212,000  Goto 212 degrees

W000,020  Wait 20 seconds (and turn off heat)

X000,000  Exit program and turn off relay
```

Multiple Profiles Stored on the SD Card

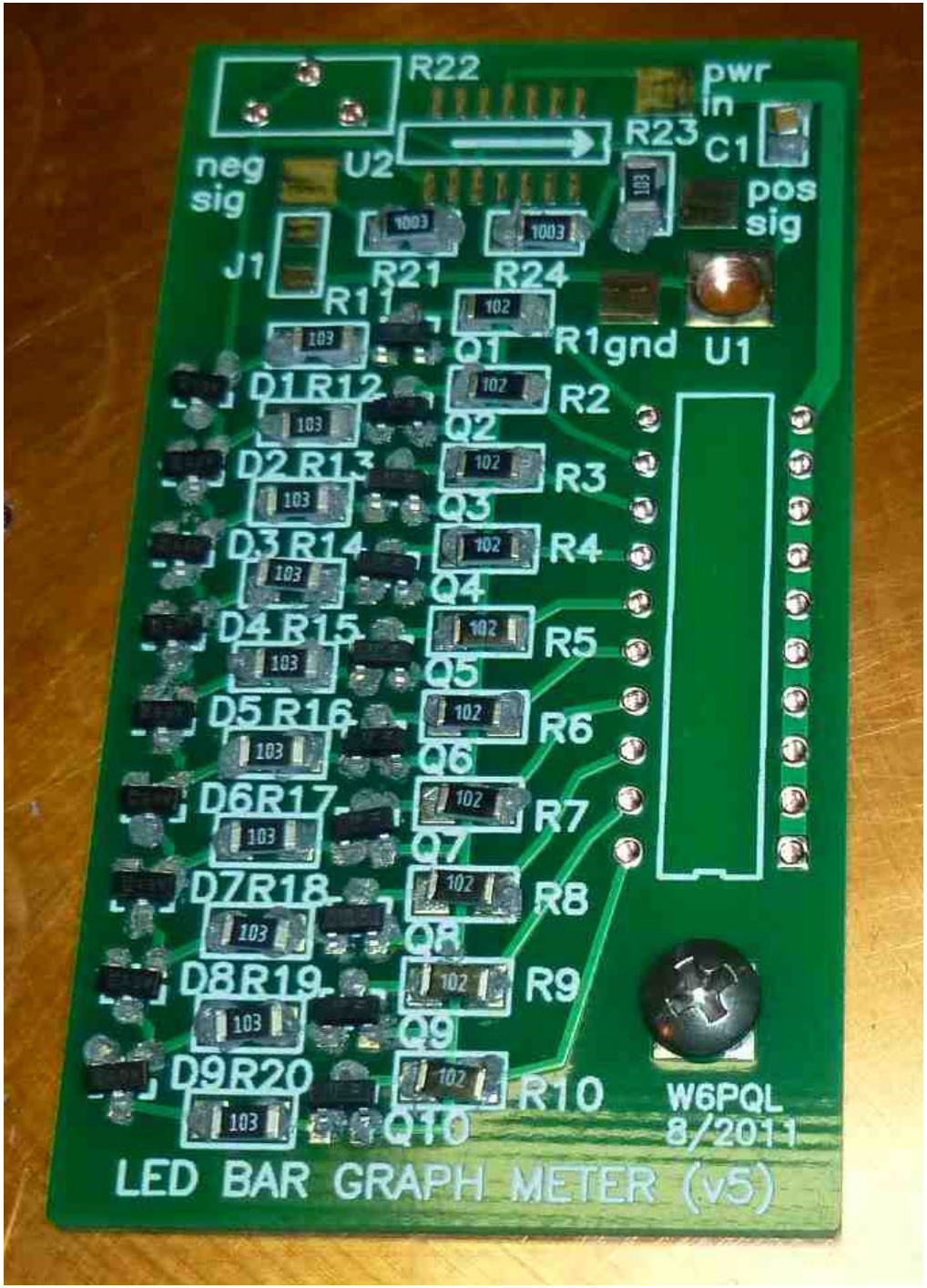
Profile 0 = Kester EP256 Solder Paste

Profile 1 = Hot Pocket Reheat

Profile 2 = Tuna Melt Sandwich

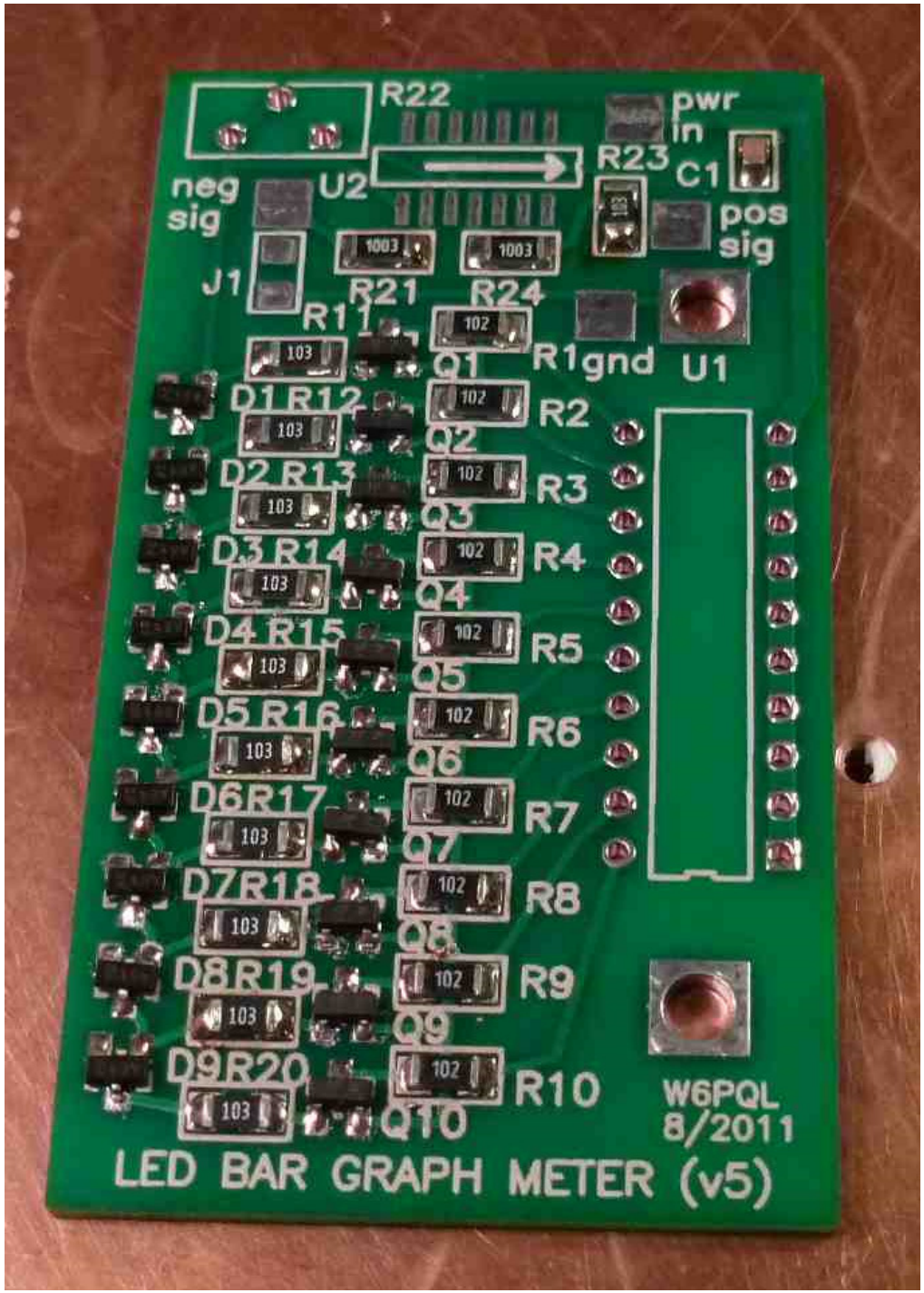
Profile 3 = Mini Pepperoni Pizza


Kester EP256
Solder Paste
Warnings:
R22
pwr in
R23
C1
neg sig
U2
pos sig
J1
R21
R24
R1
R1gnd
U1
Q1
D1 R12
R2
Q2
D2 R13
R3
Q3
D3 R14
R4
Q4
D4 R15
R5
Q5
D5 R16
R6
Q6
D6 R17
R7
Q7
D7 R18
R8
Q8
D8 R19
R9
Q9
D9 R20
R10
Q10
W6PQL
8/2011
LED BAR GRAPH METER (v5)
W6PQL
LED Meter



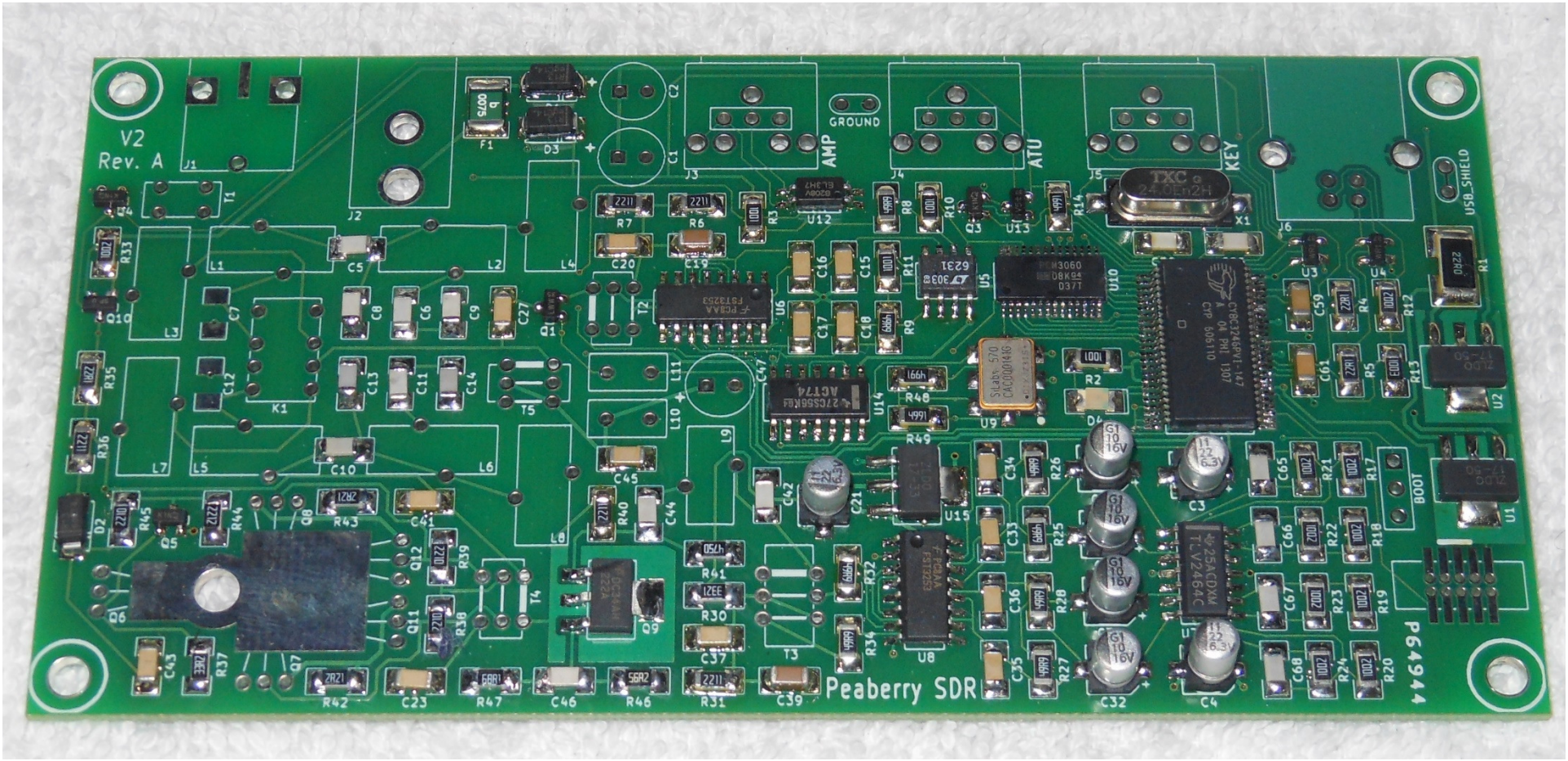
W6PQL
LED Meter
Set for oven

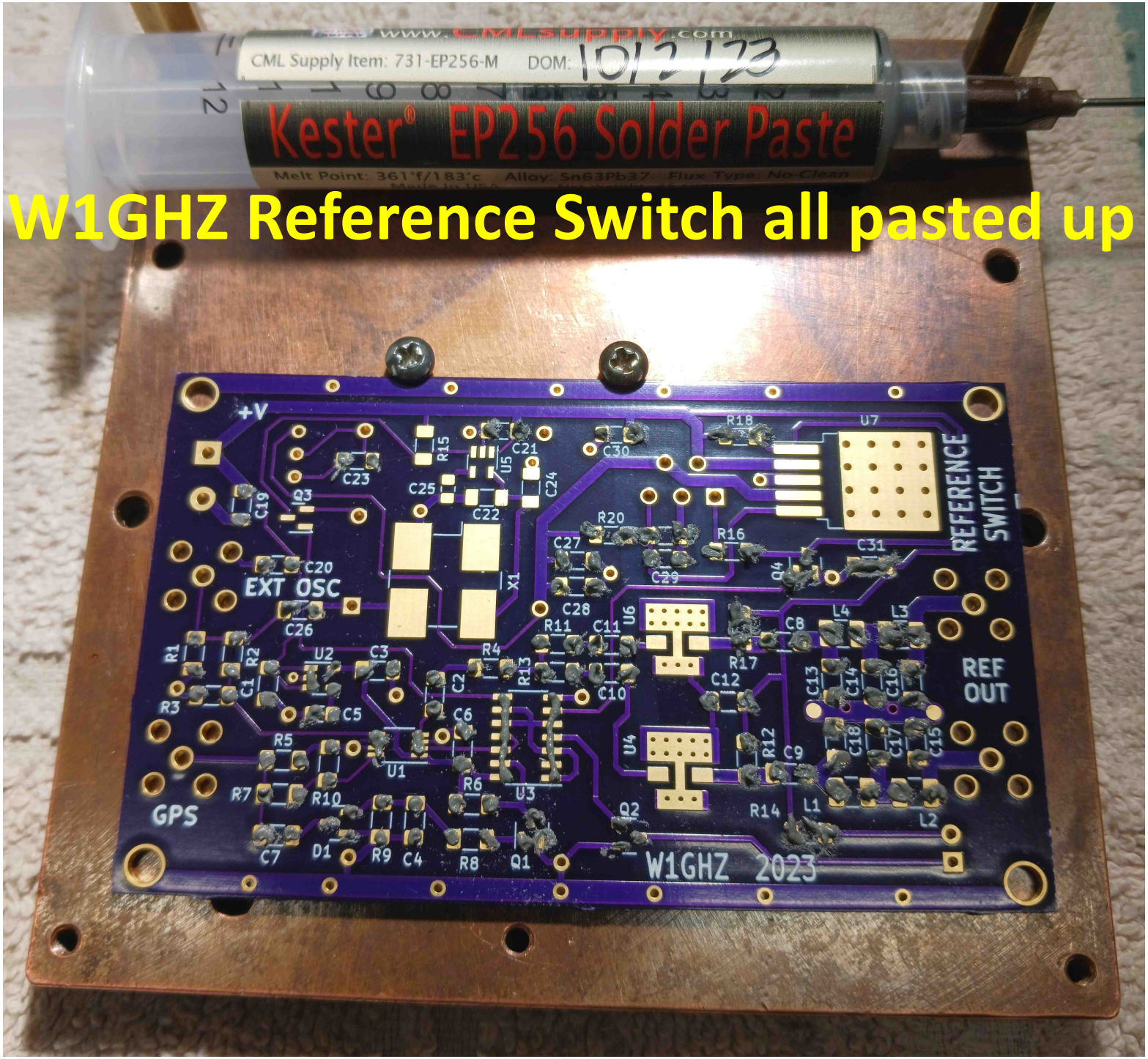

EVENT OF FOOD FLARE-UP KEEP DOOR CLOSED AND UNPLUG POWER CORD
Toast-R-Oven™
NOTA: EN CASO DE LLAMARADA, DESCONECTE EL CABLE Y MANTENGA CERRADA
BLACK&DECKER®



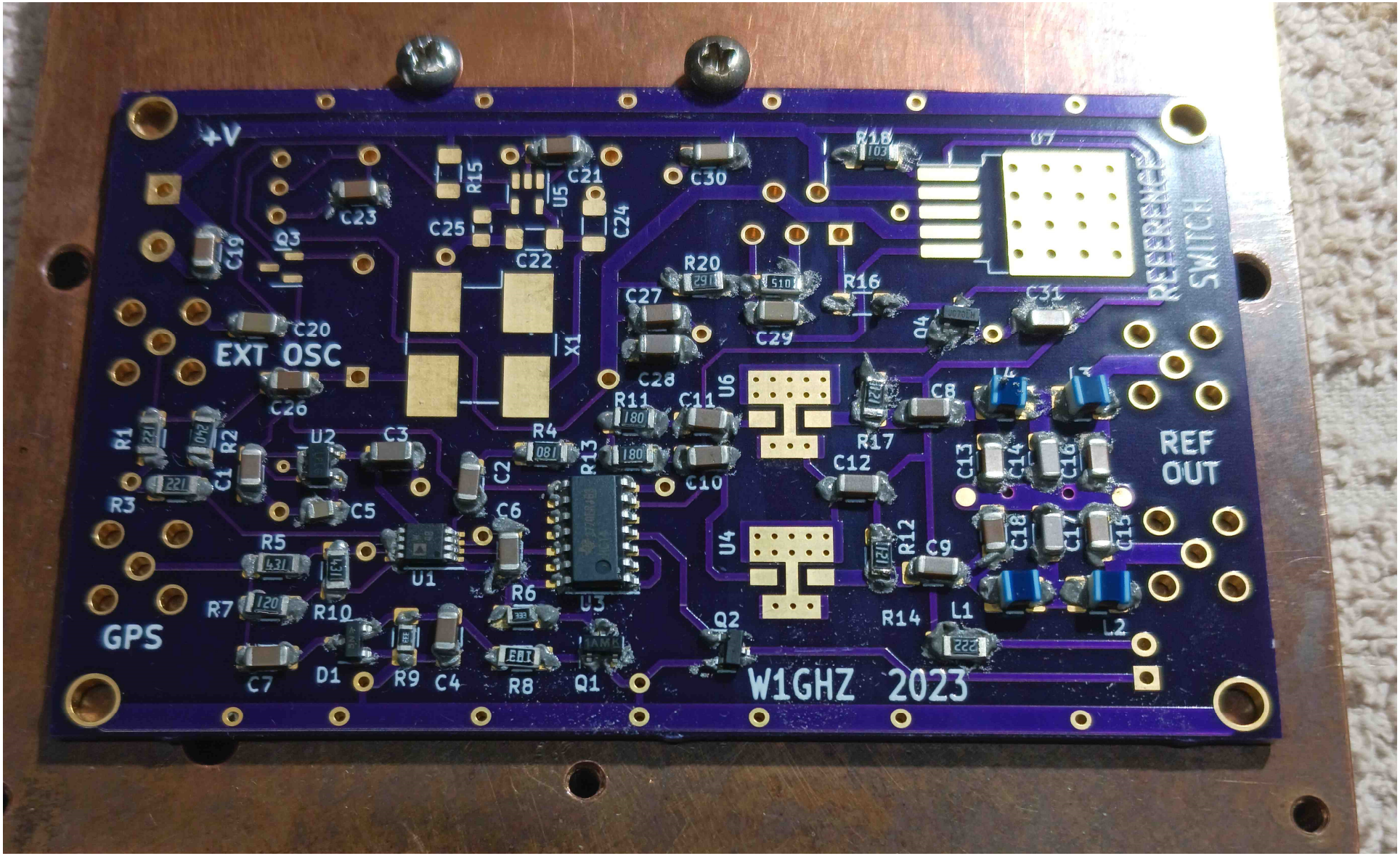
W6PQL LED Meter Fresh out of the oven

KT1VT Peaberry SDR

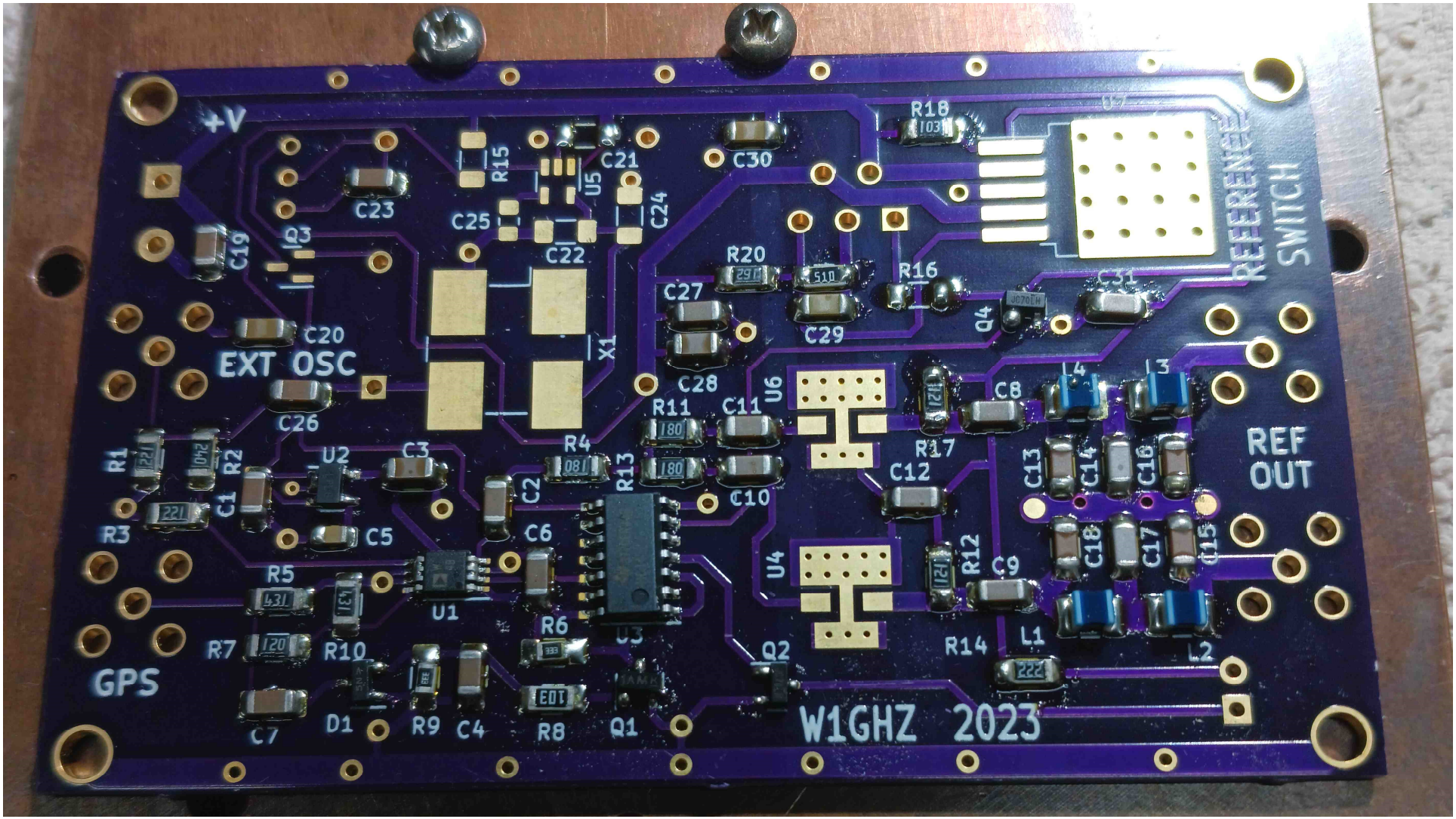



www.CMLsupply.com
CML Supply Item: 731-EP256-M DOM: 10/2/23
Kester® EP256 Solder Paste
Melt Point: 361°f/183°c Alloy: Sn63Pb37 Flux Type: No-Clean
W1GHZ Reference Switch all pasted up
+V
EXT OSC
GPS
REFERENCE SWITCH
REF OUT
W1GHZ 2023

W1GHZ Reference Switch parts placed



W1GHZ Reference Switch completed



BGU8051

Low noise high linearity amplifier

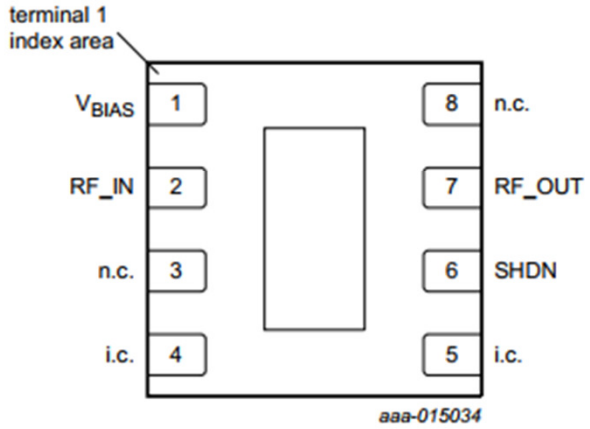
Rev. 7 — 8 June 2017

Product data sheet
COMPANY PUBLIC

- Small 8-terminal leadless package 2 mm × 2 mm × 0.75 mm

7 Pinning information

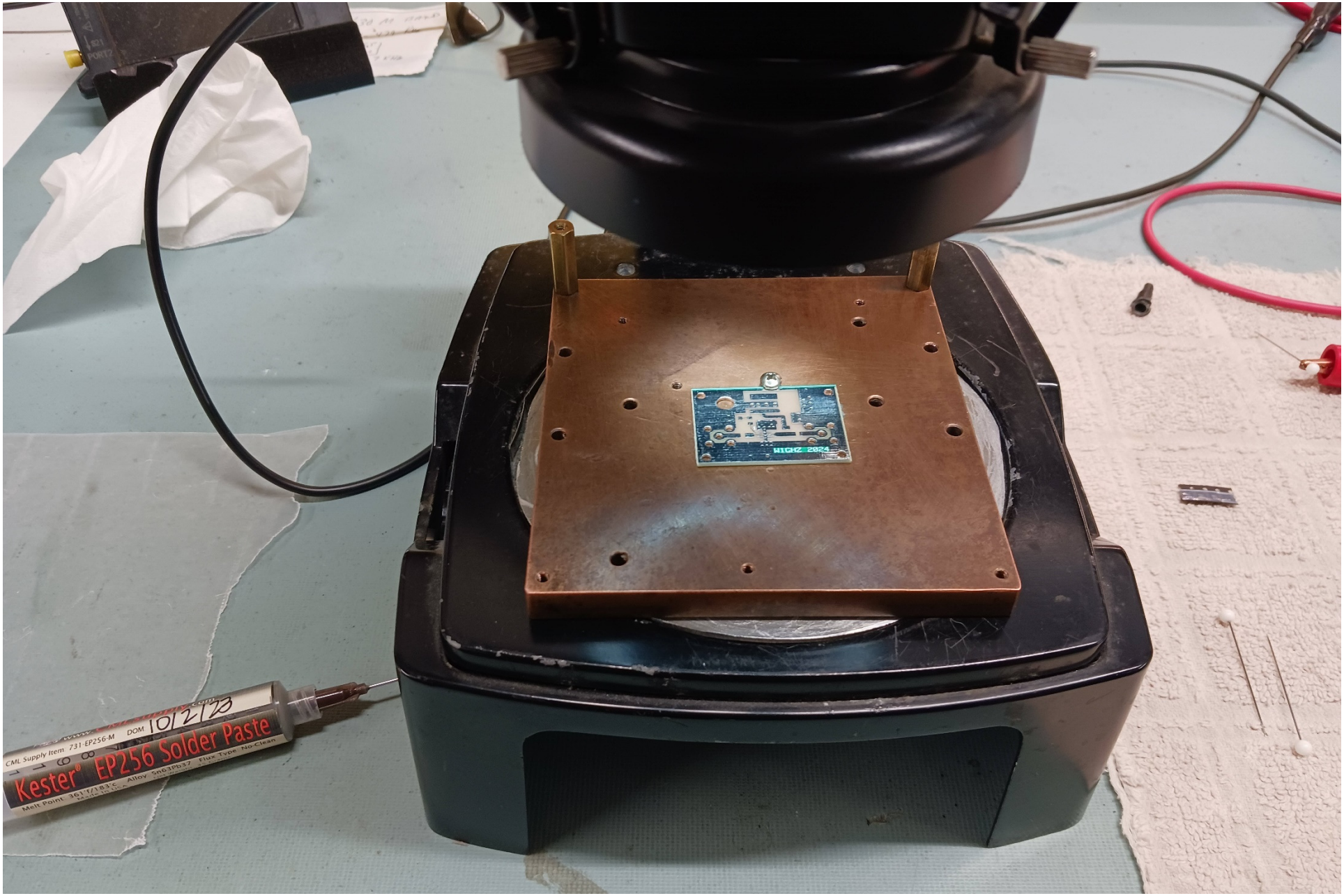
7.1 Pinning



Transparent top view

Figure 2. Pin configuration

The Shop



Board under the microscope ready for solder paste

7 Pinning information

7.1 Pinning

Yellow lines are where solder paste was placed

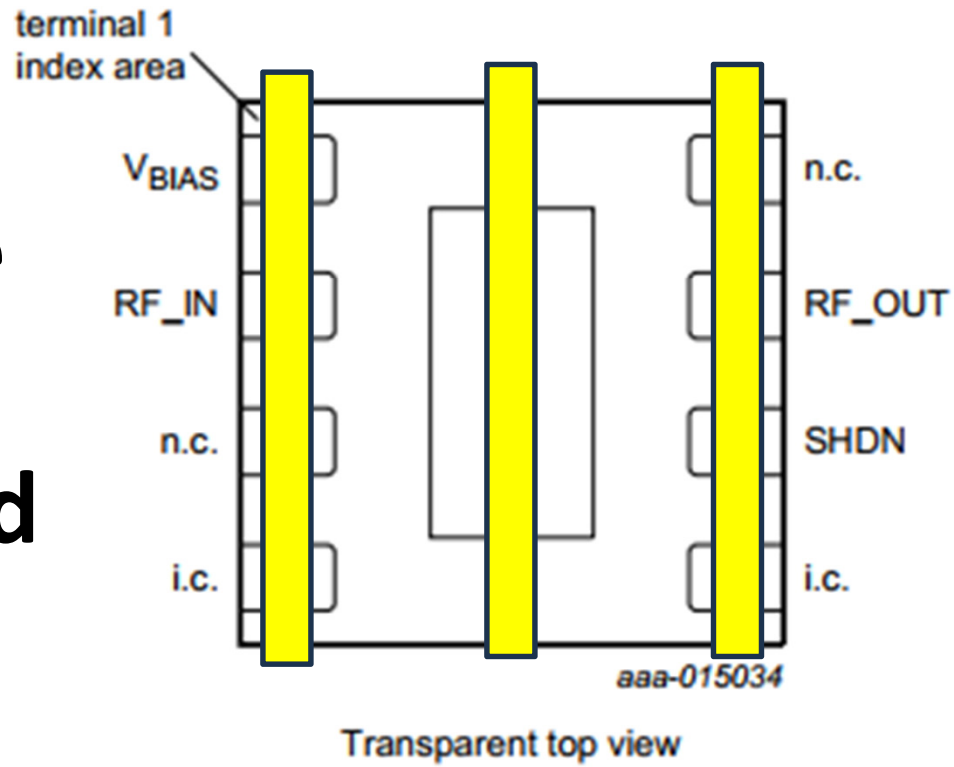
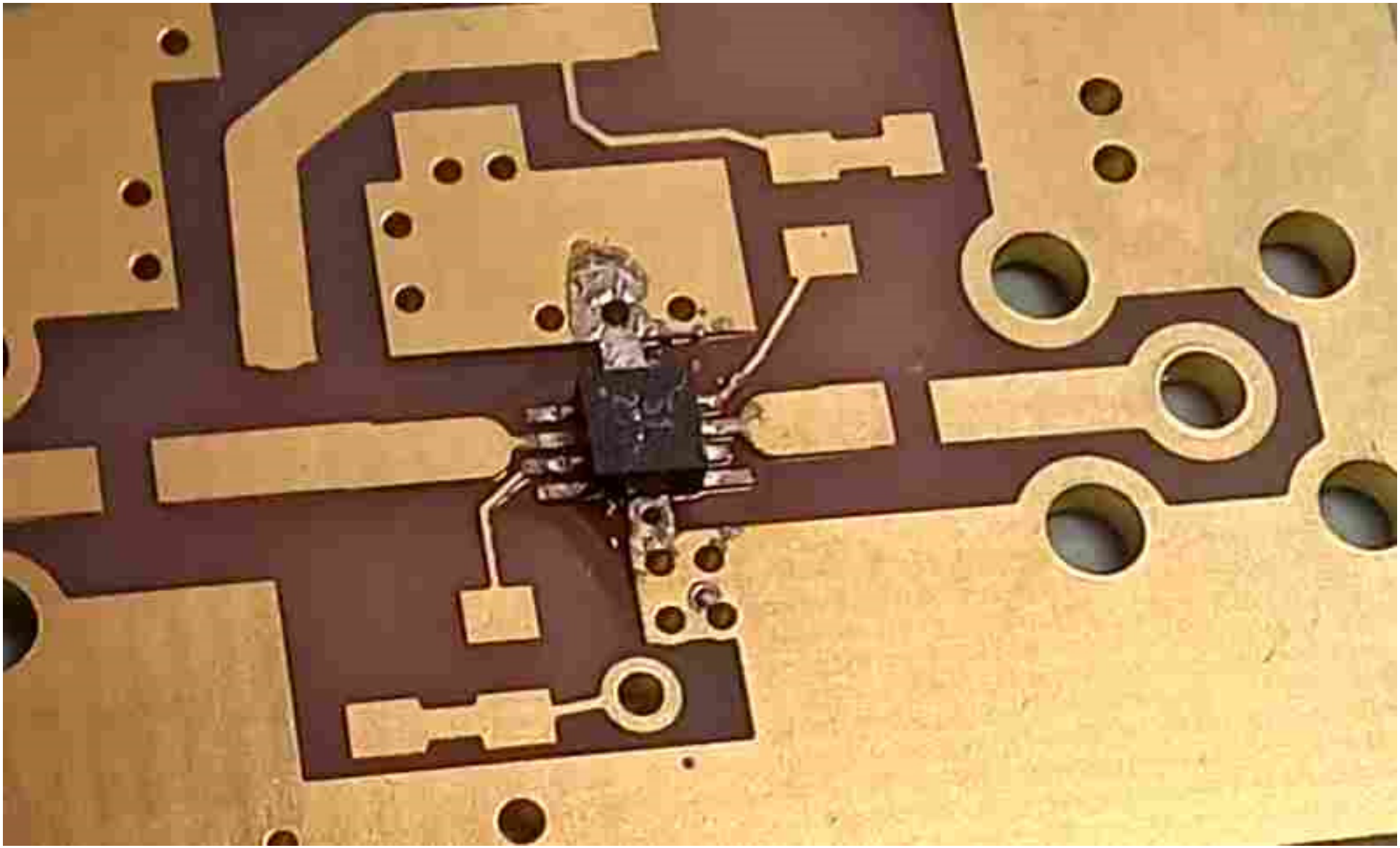
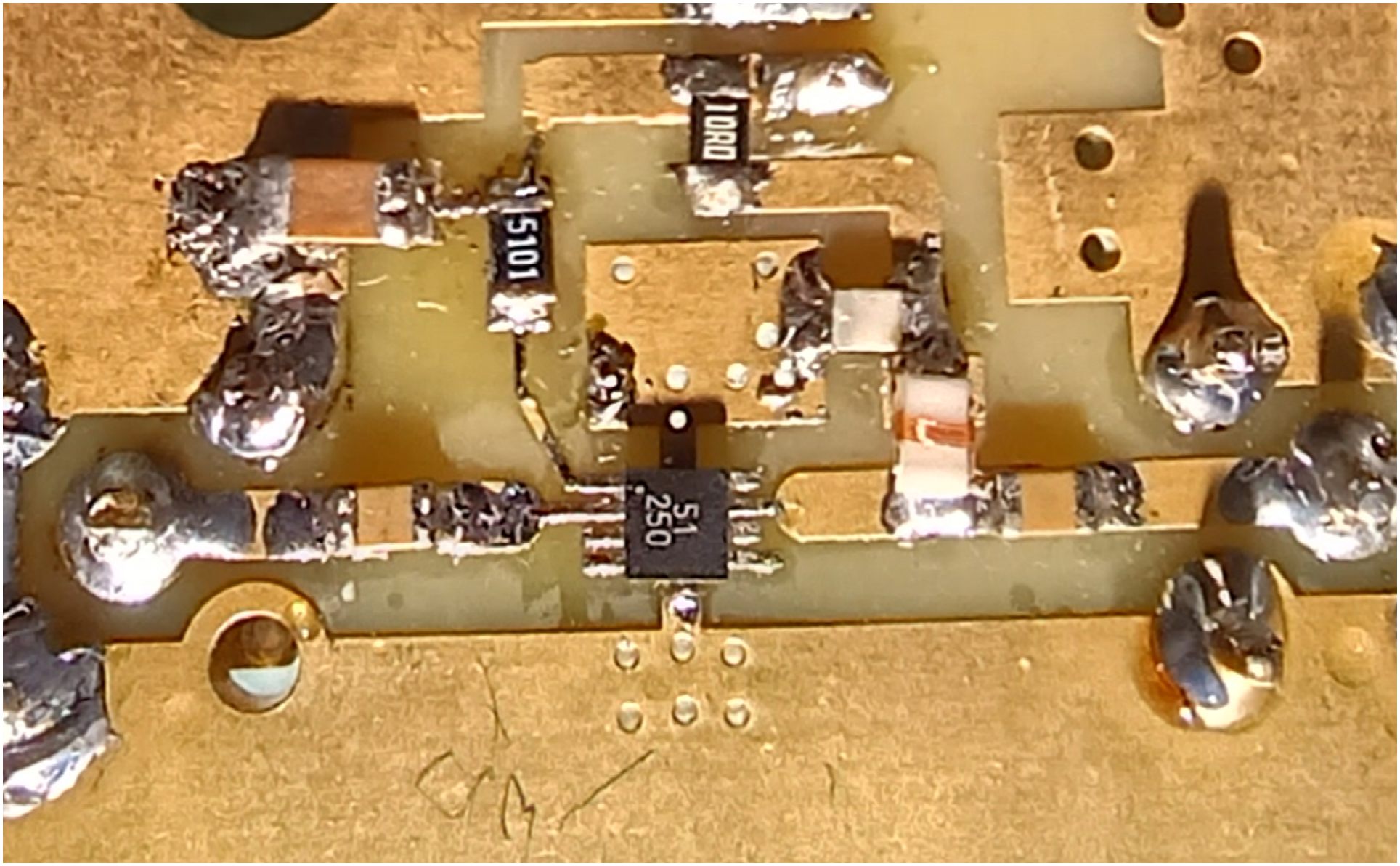


Figure 2. Pin configuration

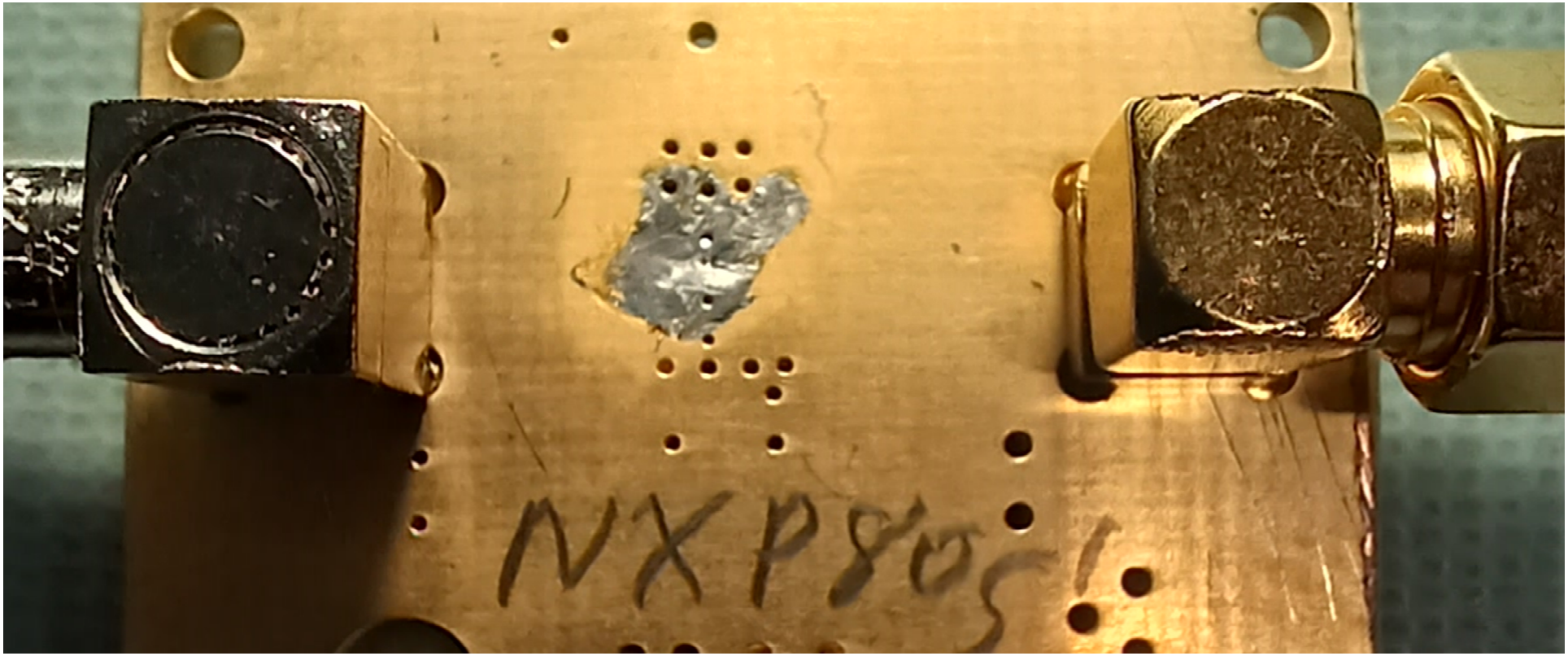
First Attempt – Test Board



Working Board



Working Board
Rear View



Wait for Solder Paste to come to room temp before use

There is a finite time for solder paste to sit before Reflo
If you start a board, plan on finishing it in one sitting

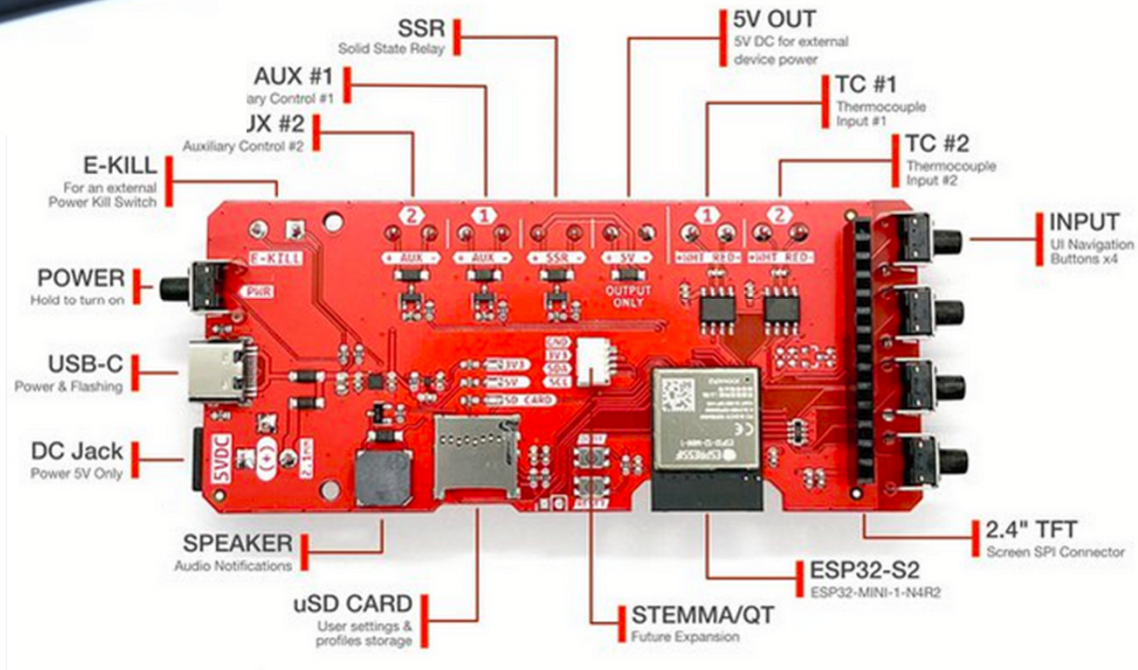
Preheat Oven at least once before use

For clean up and rework
TechSpray #2 size No Clean braid
Kester .015 No Clean 23-6337-8806 SN63PB37

For a toaster oven, get the smallest with the max heat
Mine is 1200 watt

Reflow Master Pro on Tindie

$89



QUESTIONS?

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