

# Kit PCB 2pc and 3pc Replacement- 1600, 1600 Plus and 1600AB w/ Program info

Est time: ~ 45-60 minutes... **UNPLUG THE ROASTER !!!!!**

The replacement of the front panel and power board is not a difficult procedure it is merely is time consuming. You will be removing the left and right side panels along with top panel. In the process you will remove in total 30 screws.

**Before starting the procedure familiarize yourself with the written portion and photos.**

Recommendation: As you remove a panel, place the screws for that panel inside its open cavity of that panel to prevent losing or mixing with others. 21 screws will be the same size (some stainless steel others black), and 5 smaller (inside door screws).

Tools (Photo A): one short Philips head\*screwdriver, one long (8-9") Philips head screw driver (*Highly recommended magnetic tipped*), pliers (needle nose are great) and wire cutters for snipping a wire tie- TAKE CARE TO NOT CUT ACTUAL WIRING. \* Short Philips Head should have a flattened (NOT POINTED-pointed will strip screw head) tip. The ideal short Philips head is a #2 x 4" narrow handle

The roaster (see photo B) has three main panels each with varying number of screws holding them in place. Remove them in the following order

- A) Right side panel- 6 screws. Three screws under the panel lip, three on the angle and back. Once removed slide from back to front. **\*\*Side Panel fan is attached so remove slowly, then disconnect DC power wire from PCB**
- B) Left side panel- 7 screws. Same as right side with an additional screw inside by the chamber door. To locate open the chamber door and look just inside the door opening, left side. The screw just inside the door is smaller than the rest. Be sure to not mix. Once removed slide the panel from back to front
- C) Top Panel- 8 screws. Four screws are located under the lip of the door opening. The screws located under the lip are smaller than others **use Small #2 Philips head as noted above-** Do Not mix. Four screws located along the top back. Wait to remove the top (see below)

To remove the top panel you must first straighten a "T" shaped clip (see Photo C- black arrow) so it slides through a guide (same photo- yellow arrow). To straighten the "T", take a set of pliers, look inside the top right side of the roaster, just above the control panel. You will note the "T" has been twisted/moved to be at an angle. Take the pliers and move the end portion of the "T" so that it is flat and horizontal. This will enable the flange to slide through the guide

Once done, rotate the top panel (photo D), so the left side swings out, then gently slide the right side free from the guide. When doing this note how it came out so during reassembly you repeat in reverse. You now should have a roaster as shown in Photo E.

Our next step is to remove the panel itself. This will be done by removing 5 screws (Photo F- yellow arrows) and disconnecting a ribbon/flat cable and the power cable (Photo G- yellow arrows).

You will need the long Philips head screw driver (highly recommend magnetized tip-This could prevent losing screws).

Before removing the front panel, take a moment and look at the front of the roaster specifically the gap between door and panel. You'll refer back to this mental note later.

Start with the three screws that go along the side of the roaster. We suggest removing the lower one #3 (Photo F) then working up to #1 .

Now the bottom two screws #4 and #5. Start with #4 then #5. For better understanding of their position see Photo I, # 4 and # 5

Carefully lay the panel flat so you can disengage the ribbon. If there is glue, it is easily dis-lodged/removed. Disconnect the cable and wire.

Before doing anything further take special note of the pin (rests in a little notch) for the door (Photo H) and the groove (yellow box) on the front panel's side. When replacing the panel you will need to make sure the pin slides into the groove properly. One item that helps ensure this at the base of the panel you have a square opening (Photo I) that fits over a plastic protrusion (Photo I-yellow square) on the base of the roaster.

Now to remove the power board. There are 2 versions, AB Plus and original and 1600 Plus

First step is dis-connect all the connectors. We found the "spade" can require pressing a tiny tab as noted in the following jpeg. In some instances there is a black cover over the spade but the tiny tab can visibly be seen and depressed as noted in the jpeg.

With all wires disconnected- remove the 4 screws located in each corner holding PCB to frame- now remove PCB

\*Given the new upgrade kits design, some connections will no longer be used. Those connections are 8, 9 and 10.

\*\***AB Power boards have connections with screw mounts** ...

\*\*\* **1600 / 1600 Plus Power boards have spade adapters** (included in the kit-need to be attached to screw mounts) to connect / adapt to new boards...**see Page 5**

**For 3 pc Kits- now is the time to install the new motor**

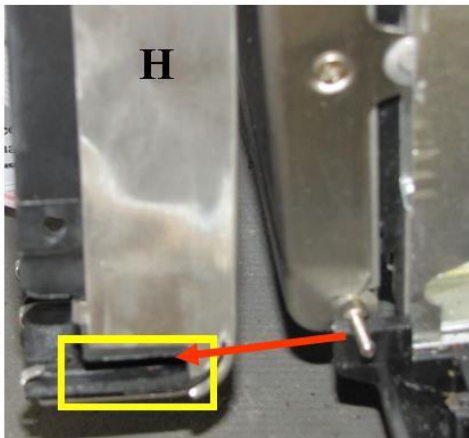
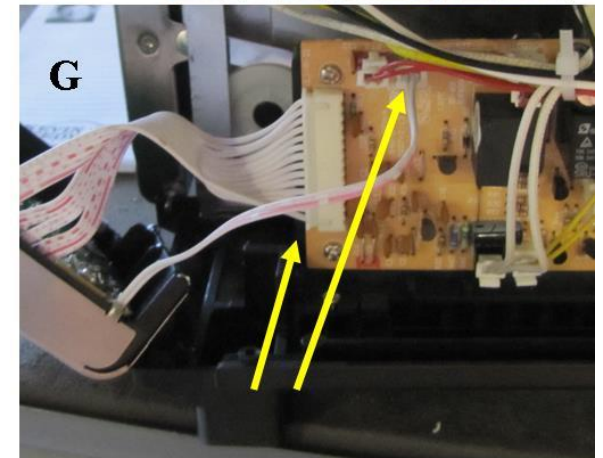
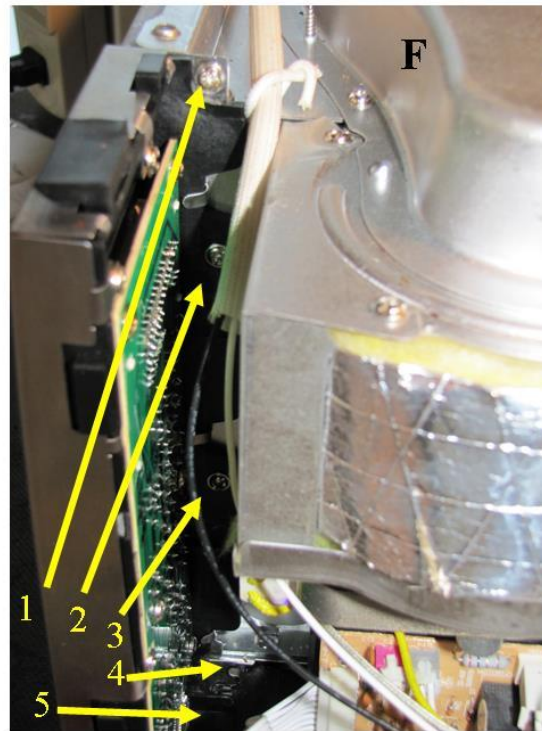
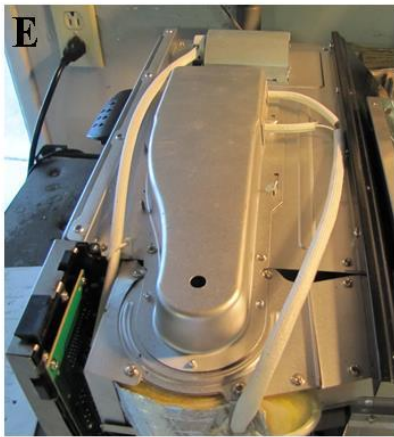
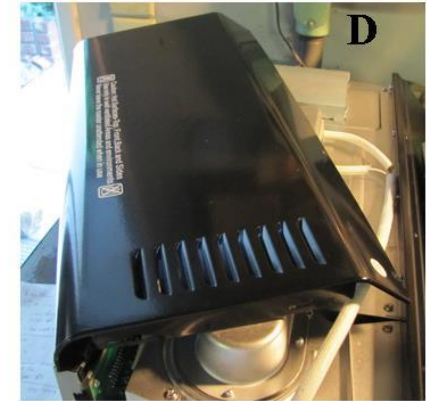
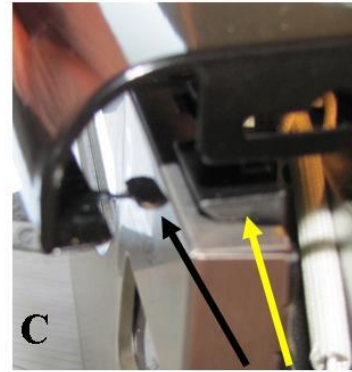
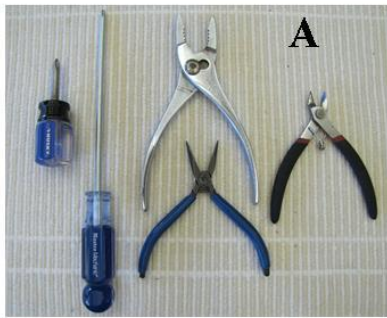
To remove old motor, locate the cylinder motor sleeve inside the roasting chamber there are 2 screws as seen. Simply remove the screws, taking care to also save the tension washers for replacement. Once screws are removed, go to motor inside the electronics area, twist about 45 degrees and the motor comes out.

Now take the new motor and install. Tip, align one hole of the motor bracket to the chamber hole and insert screw w/ washer and tighten about 90% and then do other screw.

All PCBs are susceptible to static discharge, to insure you do not accidentally zap your board's components:

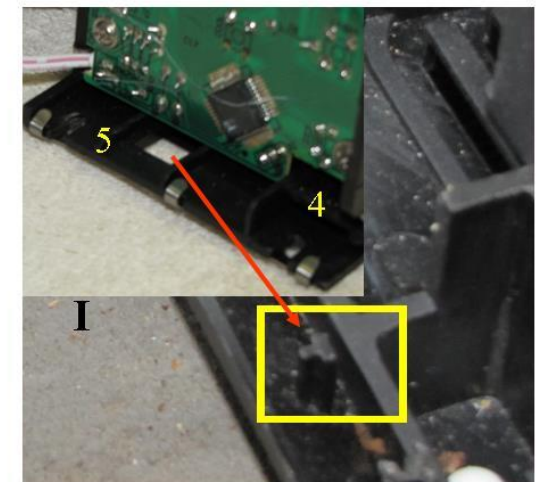
**Before you touch anything inside the roaster, put your hand(s) briefly on a metal object to dissipate any built-up static. Repeat as you go through this process before touching the new PCBs as old are replaced as a precaution.**

**AVOID CONFUSION** – **Take a PHOTO(s) of the OLD PCB BEFORE DISCONNECTING WIRES, especially the power connections 16, 17 and 18**



3 Screws along the chamber wall (1-3)  
 2 Screws at the base of the panel (4-5)

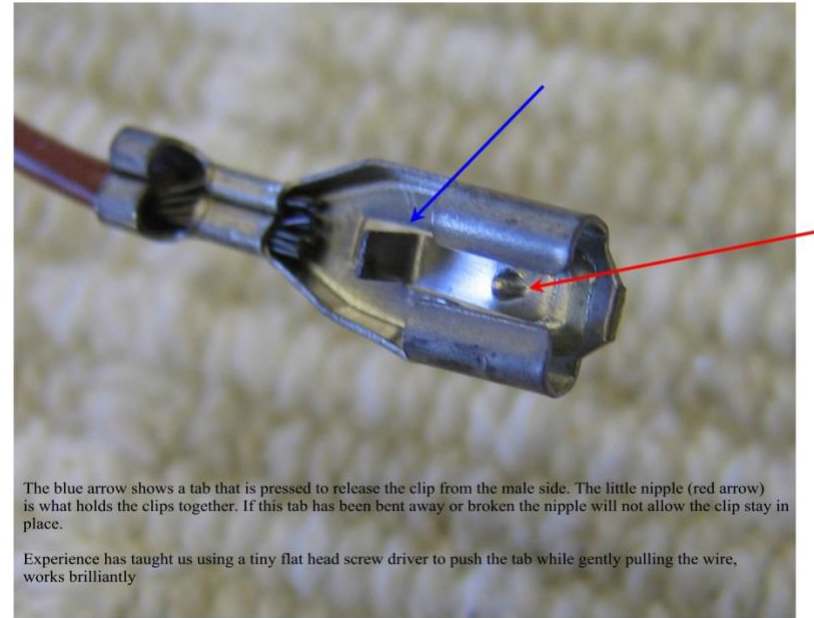
\*\*AB version has metal flashing mounted with screws 1-3



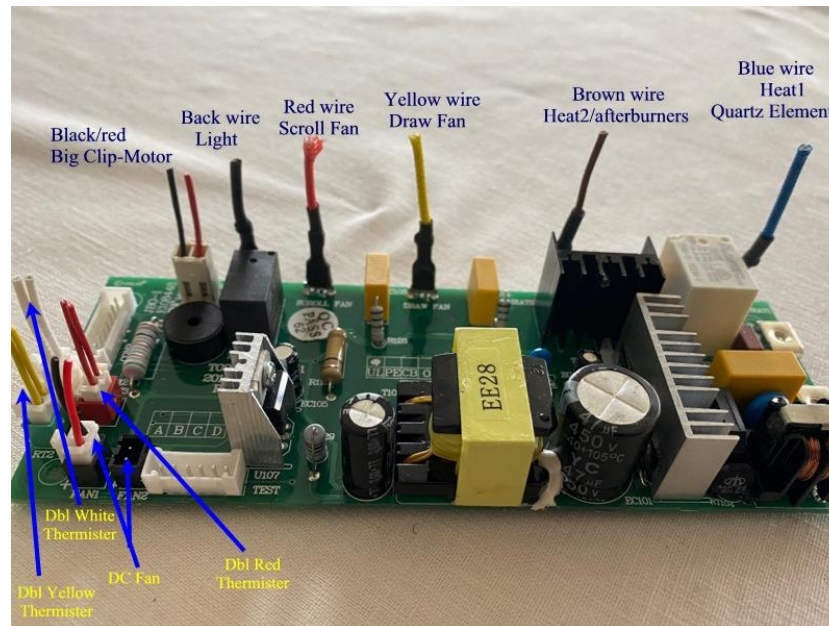
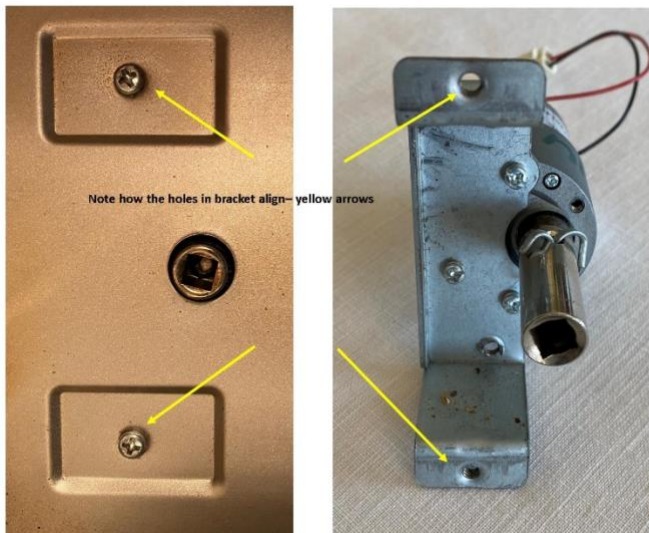
1600/ 1600 Plus Spade Connections (Top PCB)- AB Screw Mounts (Bottom)



Spade Clip release-

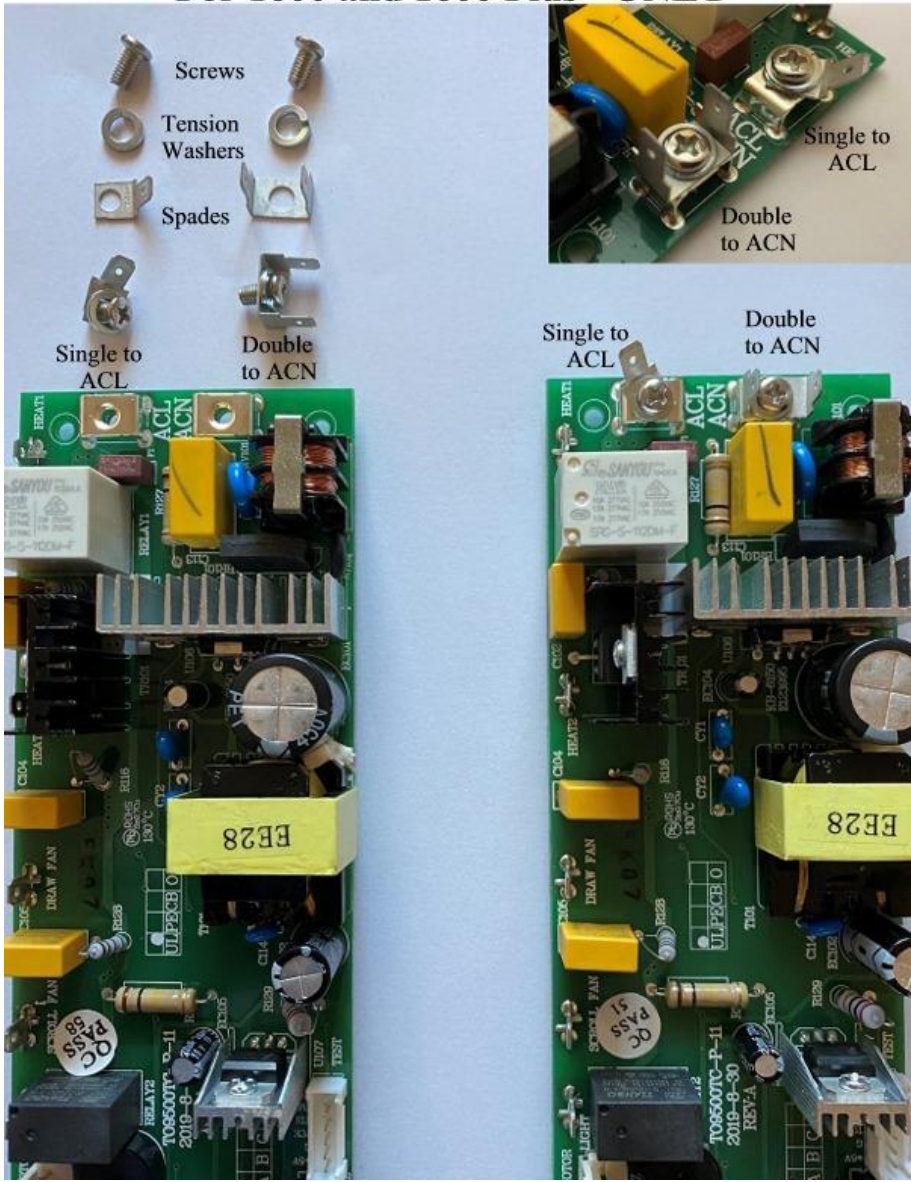


Motor location. Mounting



New PCB Connections

**For 1600 and 1600 Plus - ONLY**



**Behmor 1600/1600 Plus spade clips**

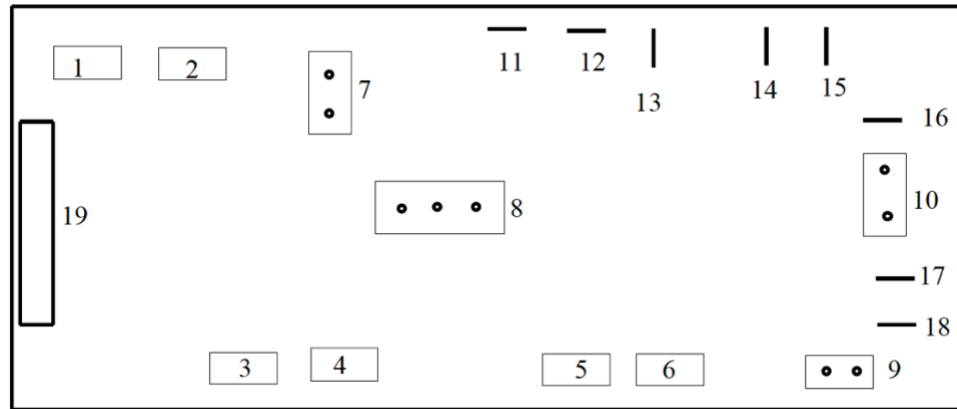
There are 2 spade clip types- a single spade for position ACL and double for position ACN  
Easiest to hold as shown- note order of spade, washer and screw

As you feel it tighten to tension washer, go slow to insure clip stays in position as shown



In your 1600/ 1600 Plus kit you will receive spade adapters to allow you to connect spade power/ neutral connections. The items are 2 screws, 2 tensions washers and 2 types of adapters- 1 single goes to ACL, 1 Double to ACN. Attach as shown above

## Original 1600 PCB Wire Color Code/ Connections (new PCB location)



### Small Clips

- 1) Dbl Red Wire- Thermister connected to DC Fan housing (New #3)
- 2) Dbl. White Wire – from Front PCB panel- DC Motor sensor **New DISCONTINUED**
- 3) Dbl. White Wire- Exhaust Channel Thermister **(New #1)**
- 4) Dbl. Yellow - Thermister connected to roasting chamber wall (New #2)
- 5) Red/Black mix- DC Fan power connection **(New #4)**
- 6) Side Panel DC fan socket **(New #5)**

### Larger Clips

- 7) Black/Red mix - Power to DC Motor (cylinder) **(New #6)**
- 8) Red/Burgundy/Green- Power from Transformer **New DISCONTINUED**
- 9) Dbl. Black- Transformer out **New DISCONTINUED**
- 10) Dbl. Red- Transformer in **New DISCONTINUED**

Single Slip Female **to avoid confusion before disconnecting take a photo of 16, 17 and 18**

- 11) Red- Scroll Fan ( bean cooling fan) **(New #8)**
- 12) Black- shiny- Interior Light **(New #7)**
- 13) Yellow- Draw Fan (exhaust-squirrel fan) **(New #9)**
- 14) Brown- Afterburners **(New #10)**
- 15) Blue- Quartz Elements (roasting) **(New #11)**
- 16) Black w/ covered clip –Power feed in (power L) **(New #12) \*\*\*\* (220v systems – red wire)**
- 17) Dbl. White- thermal sheath (common) – **(New #13) \*\*\*\* (220v systems – white wires)**

18) Black - bare clip (power N) – (New #13)\*\*\* (220v systems – light blue wire)

**Large Clip:**

19) Data Feed Connection/ flat ribbon cable (New #14)

## **Upgrade Kit Replacement cont. 1600 Plus**

### **Re-assembly**

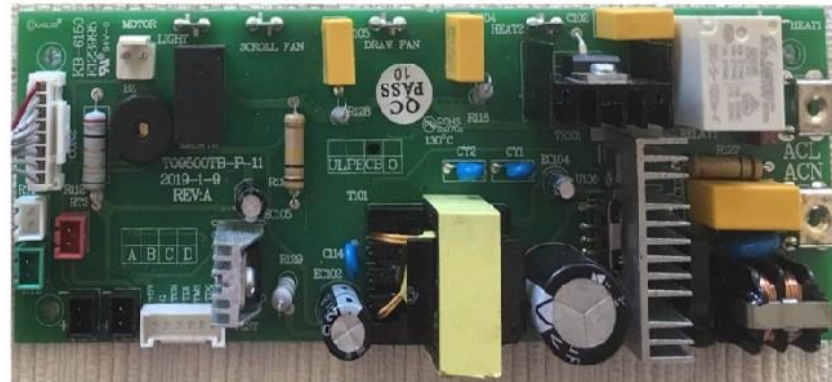
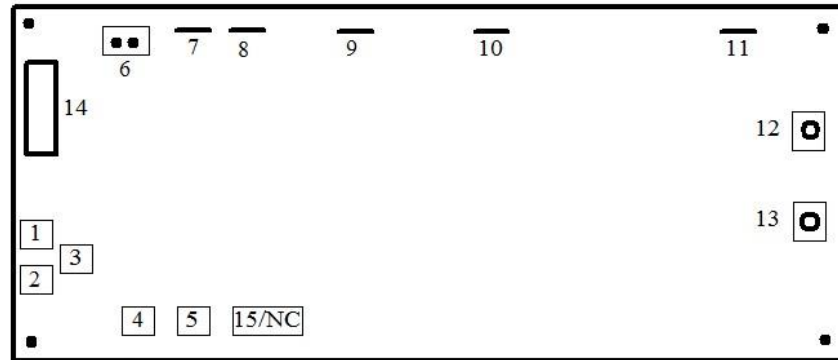
Now for reassembly which is doing for most part everything in reverse as before, with a few hints/tips on making things easier

First step would be to reconnect and attach the new power board

First secure the new power PCB to the frame using the 4 screws from disassembly.

Next step is to reattach each wire as noted in the following:

**PCB Wire Chart – Unattended w/ beeper**



- 1) Double White Wire- Exhaust channel sensor (old board position #3) **be sure connections are secure**
- 2) Yellow wires- Wall Sensor (old board #4) **be sure connections are secure**
- 3) Red wires- Fan Housing Sensor (old board #1 position) **be sure connections are secure**
- 4) DC Fan 1 (attached to angled DC fan housing)
- 5) DC Fan 2 Side Panel
- 6) Motor Connection (red/black wires)
- 7) Light- single black wire spade connector
- 8) Scroll Fan Power – single red wire spade connector
- 9) Draw Fan Power- single yellow wire spade connector
- 10) Afterburner Power (Heat 2) - single brown wire spade connector
- 11) Quartz Elements (Heat 1) - single blue wire spade connector
- 12) Incoming Power AB systems red wire (AB eyelet w. screw connection / 1600 Plus Black wire- Spade adapter- old PCB 16)
- 13) Neutral/ Common – white wires all (AB eyelet w. screw connection/ 1600 Plus Spade adapters- old PCB 17 and 18)
- 14) Front Panel Connection- flat ribbon cable
- 15) **Open. No Connection**

Once all wires (except those noted as discontinued) are reconnected plug in the single connector from the front panel-

Now carefully while pressing the START button, plug in the roaster, looking at the display you should see r4.20 then it will scroll through a function check

**Now-----Unplug the roaster !!!!!!!.**

If no, recheck all connections and retry

If yes, you saw a scrolling message proceed to the following

Next replace to attach the new panel paying close attention to the pin and groove as noted previously (Photo H) and re-insert screw #1. Once you replaced screw #1 look at the front of the roaster and check the bottom area by the pin, then look upwards. Is the gap similar in spacing as before? If, No- remove screw #1 and redo.

If yes, plug in the roaster and re-test the PCB as described in the roast manual:

To ensure all functions are working properly press each button within each group in the following order: Press all Weight buttons starting with ¼, ½, to 1 noting time in the display changes. Next, Profiles starting with P1 through P5, noting changes on the display. Check light and finally cool

Now Test 2: unplug the roaster- and as before while holding/ pressing Start- plug in your roaster then release Start. You should see a series of numbers and hear components (fans) and lights come on-

**Now-----Unplug the roaster !!!!!!!.**

Did everything test OK?

If no ..

Recheck your two connections. Make sure everything is properly re-inserted. Plug in the roaster and retry. If you are without a display, unplug the roaster and contact us immediately at tech@behmor.com Subject: front panel replacement

If yes, let's finish up. \*\*\* as before the new power PCB has a mechanical relay that when elements cycle makes a **clicking sound- this is normal**

Start by re-inserting all the screws. Start with #5 to re-ensure the panel is properly in place, then do 4, 3 and 2.

Next for the top panel. -----Remember the "T" and guide as noted previously (Photo C)?



With the panel horizontal, gently insert the “T” through the guide and swing it around so that it lays flat on the top of the roaster. Do a visual check of the area on top of the control panel to ensure it is flat. If yes, bend the “T” so the panel is locked into place.

With the top panel in position, open the roaster’s door to start with the four small screws that are used for under the lip. If you’ve ever replaced a tire you know the lug nuts should be done in a specific order. Same logic is applied here. Do not tighten any screw all the way until all are in part way. The first screw should be top left, then top right, finally the middle two. Once they are part way seated, tighten them all in the same order. Following this procedure will ensure the panel is properly aligned for each screw.

Next the top panels back for screws, far left, far right then the middle areas.

Lastly the two side panels. Left panel first (remember the small screw inside), then right side panel. Make sure in each instance you have all of the front and side guides going into their respective holes/openings. Don’t forget to reattach the side panel DC Fan.

Once everything is reassembled you need to set your control panel:

Have system unplugged, while holding the d button  plug in the roaster- 120 will be displayed, now unplug the roaster press/ hold the start button  then plug in, you’ll see a scrolling message that confirms again things are functioning as they should be.

If you get an error message on Start or temperature reading on A that stays at 32F please check sensor connections 1, 2 or 3

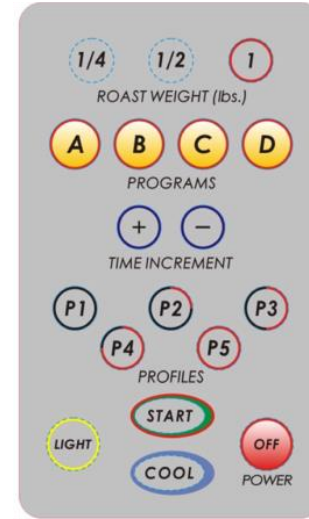
**REMINDER: ALWAYS UNPLUG YOUR ROASTER BETWEEN USE- power line surges can destroy your electronics**

**Behmor 2000AB Plus (all upgrade kits) Control Panel Features, Manual Mode & Auto-Safety Shutoff (Err 7)**

The **new program**, once a roast cycle is begun, gives you the ability to:

- 1) Read thermistors by pressing **A** (exhaust channel temp once exhaust fan is active mid-roast) or **B** (chamber wall temp) \*Temps shown are for information ONLY & Not internal chamber/ bean temps
- 2) Reset time to Rosetta Stone times (Part V Paragraph 3 manual) – **C** button
- 3) Change motor speed (**D** button)
- 4) Change power to the elements in increments :

P1	P2	P3	P4*	P5*
0%	25%	50%	75%	100%



## Auto Safety/Unattended Shutoff Feature (Err 7)

At 75% into any roast, **based on** standard system **default times\*** the timer will start blinking **un:30..29, 28 etc.**, with **loud BEEPING** sound to advise the user they have 30 seconds to **press START** otherwise it will automatically go into cool **flashing err7**. This is a required safety feature in both Automatic or Manual Modes.

## Rosetta Stone "C" Button Feature (also see last page)

Press **C** (for **crack as in first**) and it will reset the timer according to weight as per our “Rosetta Stone” times which are associated with approximate time it takes to go from the first crack of 1C to start of 2C. It is merely an approximation but provides users better understanding of where they are in the final stages of a roast cycle.

## Manual Mode



Begin a roast (Weight – desired, then Press Start), once a roast has begun at any point press either **P1** - **P5** to go into Manual mode

- 1) Press **P1** - **P5** to change power- whatever is pressed “blinks” to denote which setting
  - a) **P1** – **P3** recommended settings for finishing a roast




a) **P4 - P5** recommended for use ONLY in beginning phases of a roast, using **P4 - P5 into 1C (first crack)** when combined with bean mass heat will possibly lead to **bean scorching, under developed roasts**



- 1) Change Motor speed – press **D** (drum)
- 2) Reset time to weight (Rosetta Stone) – press **C**
- 3) Press **1** at any time to return to Auto Mode (Auto mode runs simultaneously with Manual Mode- should you toggle back to Auto the time left/ roast cycle will be the same as when you left Manual mode)

**\*\*Professional Roasting Tip\*\* Roast with Manual Mode to finish:**

Close door, press desired Weight: Example  (1/2 lb button) then the start button  (default Auto P1)

Once user hears First Cracking sound wait appx :10-15 seconds

Press: the **P3**  button **c**  then **d** 

\*\* For FC you will need to add time using the plus button  or the **c** button 

Press the cool button  as needed

\*\*Reason you are adding time is you are cutting power (using the **P3** button ) to 50% which sustains heat but gently, allowing beans exothermic momentum to work and prevent scorching beans

**Recap-** NEW features activate ONLY once a roast cycle has begun

In **Auto** (default) all buttons act the same as in current system except ABC, for temp readings and time reset.

In **Manual** (only functional after starting a roast)

Button **1**: Returns system from Manual mode to Auto (defaults).

Buttons **A** - **C** same as in auto

Button **D** - drum / cylinder motor speed toggle from standard (8 rpm) to high (16rpm)

Buttons **P1** - **P5** power to elements: P1- 0, P2-25%, P3-50%, P4\*-75%, P5\*-100%

All other buttons ¼, ½, +, -, Cooling, Light, Off remain the same in either program.

A System Self-Test can be performed by unplugging the roaster- press and hold START, plug in and release START. The Self-Test will display Program version, check all functions to include display. It will run a full check TWICE

Standard Default times are 18:00 for 1 lb, 12:00 for ½ and 8:30 for ¼

\*\*\* New running out of time Beeper Feature- :15 left you'll hear loud BEEPING 5 times to warn you the roast is about to end



The C button, are you using it to its fullest potential, if at all?

Do you have the Behmor 1600 Plus or have you upgraded with the Plus panel? Do you know about the "C" Button?

V9 w/ Program Instructions for upgrade kits

The "C" Button function was originally intended to instantly reset the timer to the approximate time it takes to go from 1C to 2C using P1 in the P1 Auto mode, but it also does so much more!

Did you know that if you Press "C" when you are even close to the time window of the unattended safety feature, it by-passes it?

I prefer to roast 12 ounces as the ideal batch size for 4 days worth of coffee. In those cases, I hit "C" with about 4:45-5:30 left on the timer and it jumps to 3:10, thus bypasses the unattended safety feature because this tells us you are there and you are actively interfacing with your roaster- which is our goal!

Another handy use of the "C" Button, is in low voltage situations, you can press it numerous times towards the end of the roast, extending available roast times.

Obviously, in both cases, the user is still in charge of the roast and prudence is advised.

Although this extremely useful "Rosetta Stone" tip is available in the manual and posted on forums, many home roasters are still not taking advantage of it, so we hope that you will.

Hope this helps add to your roasting experience,