Field Service Advisory

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

Reference
TurboChef Control Boards

Distribution
All field service personnel

Application
All Tornado, Tornado 2, HhB, HhB 2, C3, i5, i3, Sota/NGO, WS, Panini, Sota Single Mag, Encore, HhC 1618, HhC 2020, HhC 2620, and HhC 3240 model ovens

SAGE 2 Service Kits
Use the following SAGE 2 control board kits to replace all failed control boards on Tornado, Tornado 2, HhB, HhB 2, C3, i5, i3, Sota/NGO, WS, Panini, Sota Single Mag, Encore, HhC 1618, HhC 2020, HhC 2620, and HhC 3240 model ovens. Use the table below to determine which SAGE 2 control board kit to order.

Oven	Service Kit	Instructions
NGC (Tornado/Tornado2)*	CON-3007-X-Y	Page 2
HhB/HhB 2*	CON-3008-X-Y	Page 3
C3*	CON-3009-X-Y	Page 5
i5	CON-3005-X-Y	Page 7
i3	CON-3001-X-Y	Page 7
i1 Model Ovens (Sota/NGO/WS/Panini/Sota Single Mag)	CON-3004-X-Y	Page 8
Encore	CON-3006-Y	Page 8
HhC 1618	CON-3018-Y	Page 9
HhC 2020	CON-3012-Y	Page 9
HhC 2620	CON-3017-Y	Page 9
HhC 3240	CON-3013-Y	Page 9

* Tornado, Tornado 2, HhB, and C3 ovens with SAGE 2 control boards installed can now update the firmware via smart card instead of eprom chip, meaning no panel removal is required for future firmware updates.

In the above part number scheme, "X" represents the type of oven firmware (or configuration) that will be pre-loaded (or pre-set) to the control board. "Y" represents the menu settings that will be pre-loaded to the control board.

NOTE: "X" does not apply to the Encore, HhC 1618, HhC 2020, HhC 2620, and HhC 3240 ovens because these ovens each have only one version of firmware.

Here are a few examples of control board service kit part numbers:

CON-3007-1-1	CON-3001-1-1	CON-3006-1	CON-3004-2-2
Tornado/Tornado 2	i3	Encore	Sota/NGO
Tornado USA Firmware	i3/i5 TFT Firmware	General Market Menu	Starbucks Firmware
General Market Menu	General Market Menu		Starbucks Menu
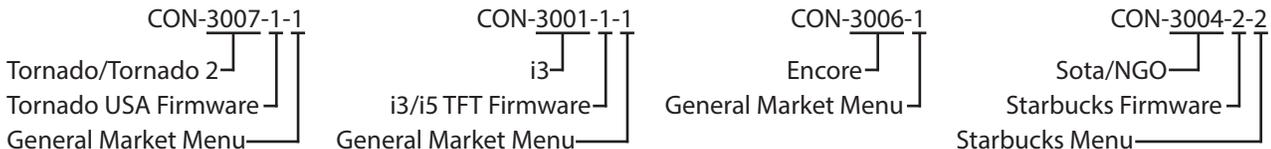
A comprehensive list of part numbers, including old service kit part numbers being replaced, can be obtained by calling TurboChef Customer Service at 1-800-90TURBO or +1 214-379-6000.

⚠ USB/Smart Card Reader

If a USB/Smart Card Reader is included in the kit, be sure to install it. Failure to install the new USB/Smart Card Reader will result in the USB not functioning properly.

NGC Ovens: SAGE 2 Installation Instructions

⚠️ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. If possible, make a backup of the menu currently installed on the oven (see service manual).
2. Install the SAGE 2 Control Board (Figure 1, below).
3. Determine whether or not the control board requires a firmware update:
   - If the control board in your possession is unprogrammed or does not match the type of oven being serviced, complete the "NGC Ovens: Firmware Update Instructions" below; when finished, continue to step 4, below.
   - If the control board does not need to be programmed, continue to step 4, below.
4. If available, load the backup of the menu made in step 1 (see service manual).
5. Input the serial number (see service manual).
6. Ensure proper oven operation.

NGC Ovens: Firmware Update Instructions

⚠️ IMPORTANT: A firmware update is NOT REQUIRED unless:
   - The control board in your possession is unprogrammed.
   - The control board programming does not match the type of oven being serviced.

⚠️ CAUTION: The oven will be inoperable if the firmware update is unsuccessful!

To obtain the latest firmware, contact TurboChef at 1-800-90TURBO or +1 214-379-6000.

From the Oven Off screen,

1. Insert the gray smart card (Figure 2).
2. If the oven is in idle mode, press the back key once to place it into cooling down mode.
3. When the oven is cooling down or off, simultaneously press the BACK and ENTER keys.
4. Enter the code 9 4 7 1.
5. There will be no feedback from the oven to indicate that the firmware update is in progress or has completed. Once the display goes blank, wait 30 seconds before removing the smart card.

The oven screen should return within 10 seconds after removing the smart card from the oven. If the display remains blank after 10 seconds:

   a. Re-insert the smart card.
   b. Unplug the oven.
   c. Plug the oven back in.
   d. Wait 30 seconds and then remove the card from the oven.
   e. If the display remains blank, contact TurboChef Technical Support at 1-800-90TURBO or +1 214-379-6000.

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2
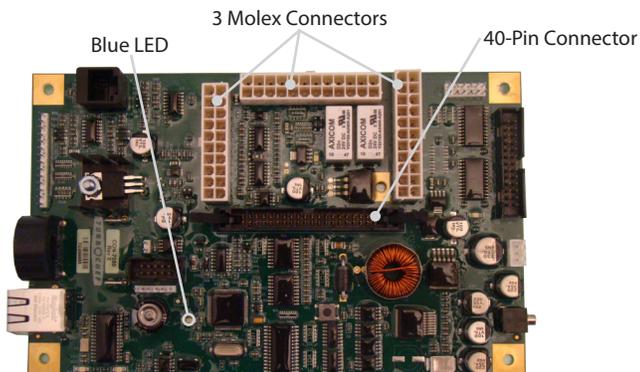
Figure 1: SAGE 2 Control Board

Blue LED — 3 Molex Connectors — 40-Pin Connector
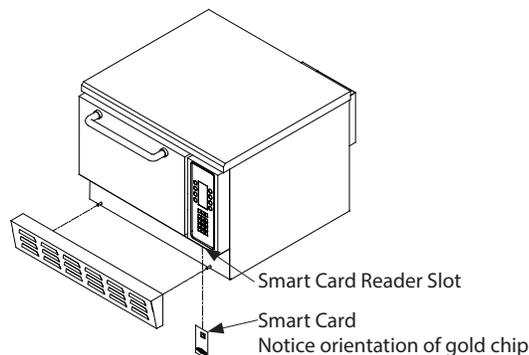
Figure 2: Inserting Smart Card - NGC

Smart Card Reader Slot
Smart Card
Notice orientation of gold chip

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

HhB and HhB2 Ovens: SAGE 2 Installation Instructions

⚠ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. If possible, make a backup of the menu currently installed on the oven (see service manual).
2. Install the SAGE 2 Control Board (Figure 1, page 2).
3. Determine whether or not a speaker is already installed in the oven:
   - Speaker already installed - continue to step 4, below.
   - Speaker not installed - complete the "HhB and HhB 2: Speaker Installation Instructions," and continue to step 4, below.
4. Determine whether or not the control board requires a firmware update:
   - If the control board in your possession is unprogrammed or does not match the type of oven being serviced, complete the "HhB and HhB 2 Ovens: Firmware Update Instructions," page 4 and continue to step 5, below.
   - If the control board does not need to be programmed, continue to step 5, below.
5. If available, load the backup of the menu made in step 1 (see service manual).
6. Input the serial number (see service manual).
7. Ensure proper oven operation.

HhB and HhB 2 Ovens: Speaker Installation Instructions

⚠ IMPORTANT: This procedure is not necessary if the oven already has a speaker installed as shown below.

⚠ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. Remove the two screws that hold the solid state relay to the electrical panel.
2. Install the speaker assembly and the solid state relay using the two screws removed in step 1.

   NOTE: Ensure the speaker assembly is oriented as shown in Figures 3 and 4 below.

3. Insert the speaker cable into the 22-pin connector on the SAGE 2 control board.
4. Perform a test cook to ensure the speaker and control board are functioning.
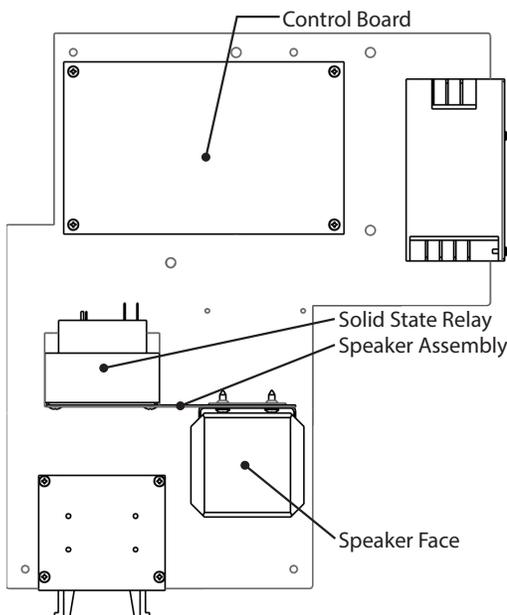
Figure 3: Original HhB Oven Electrical Panel
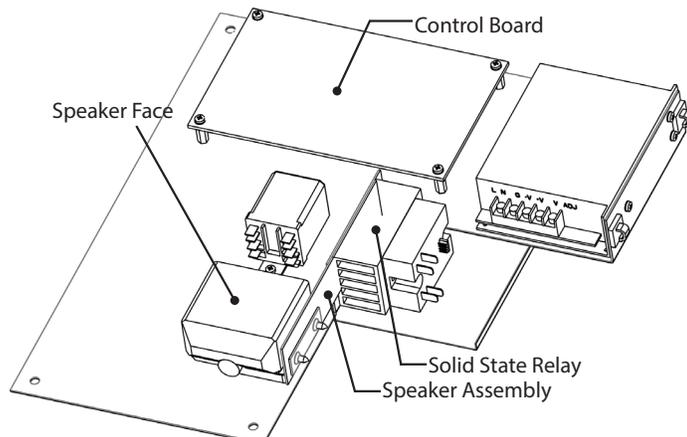
Figure 4: HhB 2 Oven Electrical Panel

HhB and HhB 2 Ovens: Firmware Update Instructions

⚠ IMPORTANT: A firmware update is NOT REQUIRED unless:
- The control board in your possession is unprogrammed.
- The control board programming does not match the type of oven being serviced.

⚠ CAUTION: The oven will be inoperable if the firmware update is unsuccessful!

To obtain the latest firmware, contact TurboChef at 1-800-90TURBO or +1 214-379-6000.

From the Oven Off screen,

1. Insert the gray smart card marked "1 of 3" (Figures 5 and 6).

2. Press and hold the ON/OFF key for 5 seconds. The oven will begin beeping, indicating that the firmware update has started.

3. When the oven beeps longer tones, remove card "1 of 3" and insert card "2 of 3."

4. When the oven beeps longer tones, remove card "2 of 3" and insert card "3 of 3."

5. When the oven beeps longer tones, remove card "3 of 3." The oven should reboot and is ready for operation.

If the display remains blank after 10 seconds:

    a. Re-insert the smart card.
    b. Unplug the oven.
    c. Plug the oven back in.
    d. Wait 30 seconds and then remove the card from the oven.
    e. If the display remains blank, contact TurboChef Technical Support at 1-800-90TURBO or +1 214-379-6000.

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

Smart card reader slot

Smart card - Notice orientation of gold chip
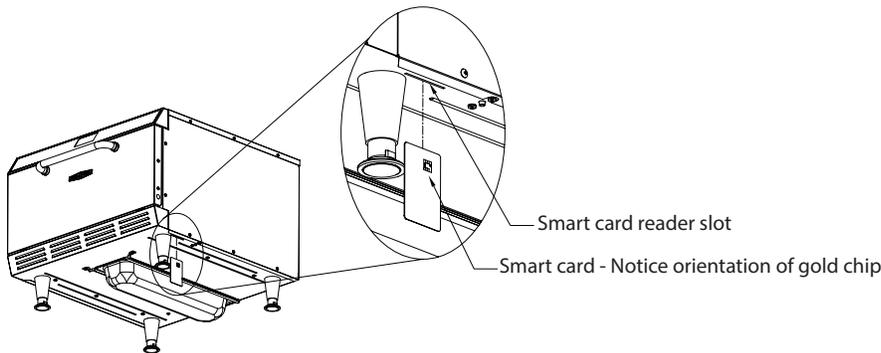
Figure 5: Inserting Smart Card - HhB

Smart card reader slot

Smart card - Notice orientation of gold chip
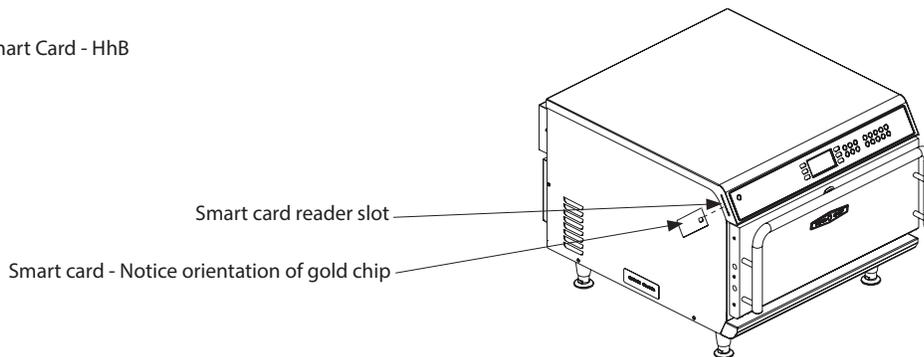
Figure 6: Inserting Smart Card - HhB 2

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

C3 Ovens: SAGE 2 Installation Instructions

⚠ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. If possible, make a backup of the menu currently installed on the oven (see service manual).
2. Install the SAGE 2 Control Board (Figure 1, page 2).
3. Inspect the 40-pin connector's wiring:
   - If pins 37 and 38 are open, continue to step 4, below.
   - If Pins 37 and 38 are populated, complete the "C3 Ovens: Modify the 40-Pin Connector," below.
4. Determine whether or not the control board needs a firmware update:
   - If the control board in your possession is unprogrammed or does not match the type of oven being serviced, complete the "C3 Ovens: Firmware Update Instructions," page 6; when finished, continue to step 5, below.
   - If the control board does not need to be programmed, continue to step 5, below.
5. If available, load the backup of the menu made in step 1 (see service manual).
6. Input the serial number (see service manual).
7. Ensure proper oven operation.

C3 Ovens: Modify 40-Pin Connector

⚠ IMPORTANT: This procedure is not necessary if the 40-pin connector's wiring has already been modified as described below.

⚠ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. Disconnect the 40-pin connector from the control board.
2. Remove the wires from pins 35 and 36 (Figure 7).
3. Move the wire from pin 37 to pin 35 (Figure 7).
4. Move the wire from pin 38 to pin 36 (Figure 7).

   NOTE: Be sure to correctly insert the wire terminal into the connector. Each terminal has a flag on one side, which locks the terminal into the connector by sticking through the opening on the connector (Figure 8).

5. Confirm the wire terminals are seated properly into the 40-pin connector by gently pulling it.
6. Reconnect the 40-pin connector to the control board.

ODD			EVEN
WHITE	1	2	OPEN
OPEN	3	4	OPEN
OPEN	5	6	ORANGE
WHITE	7	8	WHITE
WHITE	9	10	WHITE
WHITE	11	12	OPEN
OPEN	13	14	OPEN
OPEN	15	16	RED
OPEN	17	18	RED
RED	19	20	BLACK
BLACK	21	22	BLACK
BLACK	23	24	RED
BLACK	25	26	OPEN
WHITE	27	28	OPEN
OPEN	29	30	WHITE
WHITE	31	32	WHITE
OPEN	33	34	OPEN
Step 3: Remove this wire → RED	35	36	YELLOW ← Step 3: Remove this wire
Step 4: Move this wire to pin 35 → RED	37	38	YELLOW ← Step 5: Move this wire to pin 36
RED	39	40	YELLOW

Figure 7: 40-Pin Connector

CRIMPED WIRE

FLAG
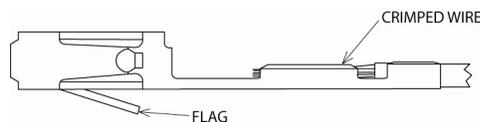
Figure 8: Wire Terminal Detail

C3 Ovens: Firmware Update Instructions

⚠ IMPORTANT: A firmware update is NOT REQUIRED unless:
- The control board in your possession is unprogrammed.
- The control board programming does not match the type of oven being serviced.

⚠ CAUTION: The oven will be inoperable if the firmware update is unsuccessful!

To obtain the latest firmware, contact TurboChef at 1-800-90TURBO or +1 214-379-6000.

From the Oven Off screen,

1. Insert the gray smart card (Figure 9).
2. If the oven is in idle mode, press the back key once to place it into cooling down mode.
3. When the oven off, unplug the oven.
4. Plug in the oven.
5. There will be no feedback from the oven to indicate that the firmware update is in progress or has completed. Once the display goes blank, wait 30 seconds before removing the smart card.

The oven screen should return within 10 seconds after removing the smart card from the oven. If the display remains blank after 10 seconds:

    a. Re-insert the smart card.
    b. Unplug the oven.
    c. Plug the oven back in.
    d. Wait 30 seconds and then remove the card from the oven.
    e. If the display remains blank, contact TurboChef Technical Support at 1-800-90TURBO or +1 214-379-6000.

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

Smart Card Reader Slot

Smart Card
Notice orientation of gold chip
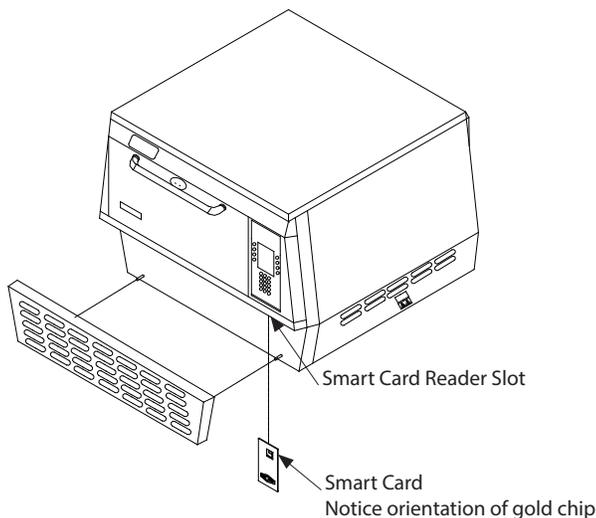
Figure 9: Inserting Smart Card - C3

i3 and i5 Ovens: SAGE 2 Installation Instructions

⚠ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. If possible, make a backup of the menu currently installed on the oven (see service manual).

2. Install the SAGE 2 Control Board (Figure 1, page 2).

3. Determine whether or not the control board needs a firmware update:
   - If the control board in your possession is unprogrammed, does not match the type of oven being serviced, or the oven is operating slowly (e.g., the oven does not seem to respond, will not change screens properly, or warm up/cook properly), complete the "i3 and i5 Ovens: Firmware Update Instructions," below; when finished, continue to step 4, below.
   - If the control board does not need to be programmed, continue to step 4, below.

4. Set the oven type:
   a. From the Cooling Down or Off screen, press the Info key.
   b. Press the Down Arrow key to scroll to screen 2.
   c. Press the "Set Options" soft key
   d. Enter 9 4 2 8 as the password.
   e. In the lower-right corner of the screen, verify that the oven type is set correctly. i3 ovens should show "i3" and i5 ovens should show "i5" (Figure 10).
   f. If the oven type is not correct, press the adjacent soft key to change it.
   g. Press the On/Off key to return to the Cooling Down or Off screen.

5. If available, load the backup of the menu made in step 1 (see service manual).

6. Input the serial number (see service manual).

7. Ensure proper oven operation.
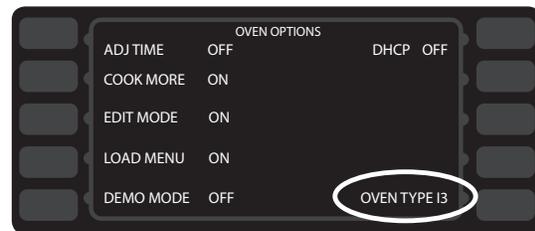
Figure 10: Oven Type Setup

	OVEN OPTIONS	
ADJ TIME	OFF	DHCP OFF
COOK MORE	ON	
EDIT MODE	ON	
LOAD MENU	ON	
DEMO MODE	OFF	OVEN TYPE I3

i3 and i5 Ovens: Firmware Update Instructions

⚠ IMPORTANT: A firmware update is NOT REQUIRED unless:
   - The control board in your possession is unprogrammed.
   - The control board programming does not match the type of oven being serviced.
   - The oven does not seem to respond, will not change screens properly, or warm up/cook properly.

⚠ CAUTION: The oven will be inoperable if the firmware update is unsuccessful!

To obtain the latest firmware, contact TurboChef at 1-800-90TURBO or +1 214-379-6000.

From the Oven Off screen,

1. Insert the gray smart card marked "1 of 2" (Figure 11).

2. Press and hold the Info key for 5 seconds. The oven will begin beeping, indicating that the firmware update has started.

3. When the oven beeps longer tones, remove card "1 of 2" and insert card "2 of 2."

4. When the oven beeps longer tones, remove card "2 of 2." The oven should reboot and is ready for operation.

If the display remains blank after 10 seconds:
   a. Re-insert the smart card.
   b. Unplug the oven.
   c. Plug the oven back in.
   d. Wait 30 seconds and then remove the card from the oven.
   e. If the display remains blank, contact TurboChef Technical Support at 1-800-90TURBO or +1 214-379-6000.

Smart Card
Notice orientation of gold chip

Smart Card Reader Slot
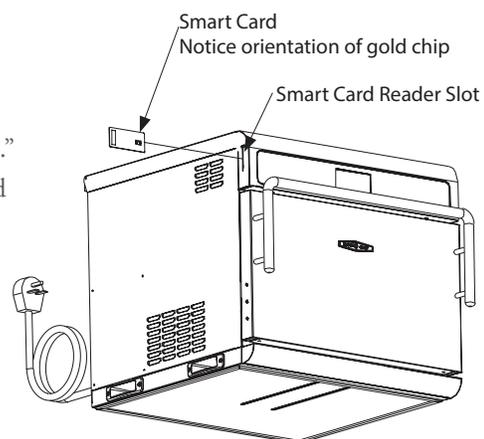
Figure 11: Inserting Smart Card - i3 and i5

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

Encore and i1 Model Ovens: SAGE 2 Installation Instructions

⚠️ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. If possible, make a backup of the menu currently installed on the oven (see service manual).
2. Install the SAGE 2 Control Board (Figure 1, page 2).
3. Determine whether or not the control board needs a firmware update:
   - If the control board in your possession is unprogrammed, does not match the type of oven being serviced, or the oven is operating slowly (e.g., the oven does not seem to respond, will not change screens properly, or warm up/cook properly), complete the "Enore and i1 Model Ovens: Firmware Update Instructions," below; when finished, continue to step 4, below.
   - If the control board does not need to be programmed, continue to step 4, below.
4. If available, load the backup of the menu made in step 1 (see service manual).
5. Input the serial number (see service manual).
6. Ensure proper oven operation.

Encore and i1 Model Ovens: Firmware Update Instructions

⚠️ IMPORTANT: A firmware update is NOT REQUIRED unless:
   - The control board in your possession is unprogrammed.
   - The control board programming does not match the type of oven being serviced.
   - The oven does not seem to respond, will not change screens properly, or warm up/cook properly.

⚠️ CAUTION: The oven will be inoperable if the firmware update is unsuccessful!

To obtain the latest firmware, contact TurboChef at 1-800-90TURBO or +1 214-379-6000.

From the Oven Off screen,

1. Insert the gray smart card marked "1 of 3" (Figures 12 and 13).
2. Press and hold the *i* key for 5 seconds. The oven will begin beeping, indicating that the firmware update has started.
3. When the oven beeps longer tones, remove card "1 of 3" and insert card "2 of 3."
4. When the oven beeps longer tones, remove card "2 of 3" and insert card "3 of 3."
5. When the oven beeps longer tones, remove card "3 of 3." The oven should reboot and is ready for operation.

If the display remains blank after 10 seconds:
   a. Re-insert the smart card.
   b. Unplug the oven.
   c. Plug the oven back in.
   d. Wait 30 seconds and then remove the card from the oven.
   e. If the display remains blank, contact TurboChef Technical Support at 1-800-90TURBO or +1 214-379-6000.

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2
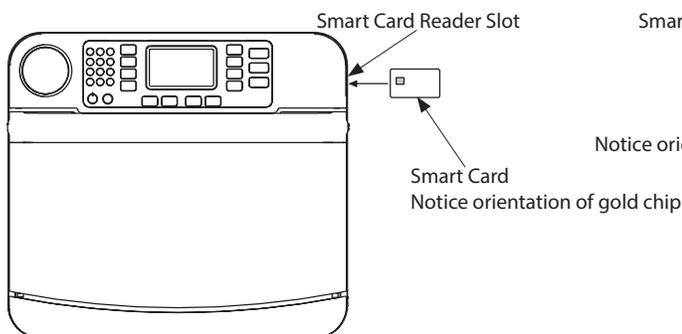
Figure 12: Inserting Smart Card - Encore
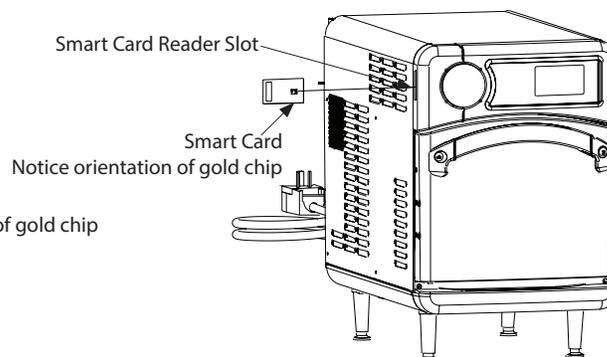
Figure 13: Inserting Smart Card - i1 Model Ovens

HhC 1618, HhC 2020, HhC 2620, and HhC 3240 Ovens: SAGE 2 Installation Instructions

⚠️ WARNING: Before replacing any oven component, ensure the oven is removed from any power source. Replacing a component while the oven is plugged in can result in serious injury or death.

1. If possible, make a backup of the menu currently installed on the oven (see service manual).
2. Install the SAGE 2 Control Board (Figure 1, page 2).
3. Determine whether or not the control board needs a firmware update:
   - If the control board in your possession is unprogrammed or does not match the type of oven being serviced, complete the "HhC 1618, HhC 2020, HhC 2620, and HhC 3240: Firmware Update Instructions," below; when finished, continue to step 5, below.
   - If the control board does not need to be programmed, continue to step 4, below.
4. If available, load the backup of the menu made in step 1 (see service manual).
5. Input the serial number (see service manual).
6. Ensure proper oven operation.

HhC 1618, HhC 2020, HhC 2620, and HhC 3240 Ovens: Firmware Update Instructions

⚠️ IMPORTANT: A firmware update is NOT REQUIRED unless:
   - The control board in your possession is unprogrammed.
   - The control board programming does not match the type of oven being serviced.

⚠️ CAUTION: The oven will be inoperable if the firmware update is unsuccessful!

To obtain the latest firmware, contact TurboChef at 1-800-90TURBO or +1 214-379-6000.

From the Oven Off screen,

1. Insert the gray smart card marked "1 of 2" (Figures 14, 15, and 16).
2. Press and hold the Idle key for 5 seconds. The oven will begin beeping, indicating that the firmware update has started.
3. When the oven beeps longer tones, remove card "1 of 2" and insert card "2 of 2."
4. When the oven beeps longer tones, remove card "2 of 2." The oven should reboot and is ready for operation.

If the display remains blank after 10 seconds:

   a. Re-insert the smart card.
   b. Unplug the oven.
   c. Plug the oven back in.
   d. Wait 30 seconds and then remove the card from the oven.
   e. If the display remains blank, contact TurboChef Technical Support at 1-800-90TURBO or +1 214-379-6000.

X	NGC
X	HHB
X	C3
X	i5
X	i3
X	i1 (Sota/NGO)
X	Encore
X	HhC 3240
X	HhC 2020
X	HhC 2620
X	HhC 1618
	G5
	TSO
	TDO
	TDO2

Smart Card Reader Slot

Smart Card
Notice orientation of gold chip
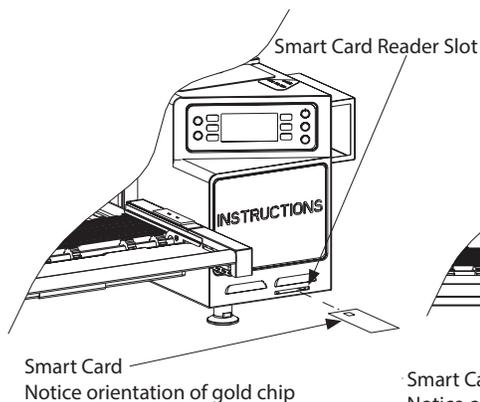
Figure 14: Inserting Smart Card - HhC 1618

Smart Card Reader Slot

Smart Card
Notice orientation of gold chip
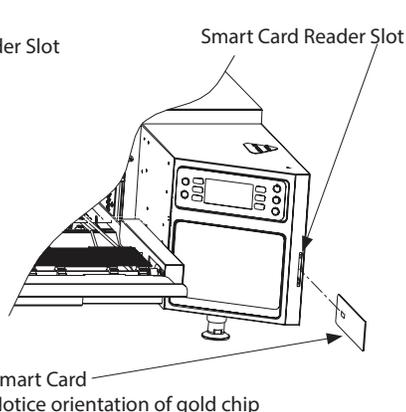
Figure 15: Inserting Smart Card - HhC 2020 & HhC 2620

Smart Card
Reader Slot

Smart Card
Gold chip faces the back of the oven
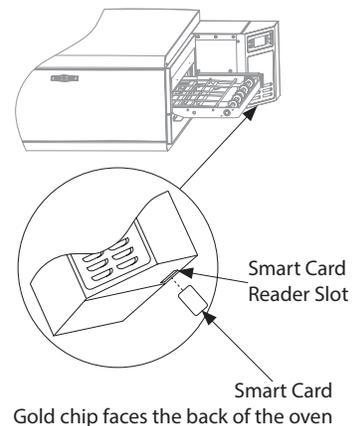
Figure 16: Inserting Smart Card - HhC 3240