Fast Track Troubleshooting

IMPORTANT SAFETY NOTICE – "For Technicians Only" This service data sheet is intended for use by persons having electrical, electronic, and mechanical experience and knowledge at a level generally considered acceptable in the appliance repair trade. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible, nor assume any liability for injury or damage of any kind arising from the use of this data sheet.

DR Publication #RF22V01
Original Production date: 4-22-16 Update: N/A

Model: RF22K
RF28K

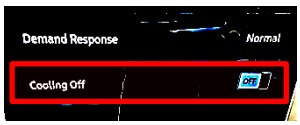
For More details on usage Of Family Hub go to E-learning Elite Service Under the Training Library

Support Information:
HELP: 1-888-751-4086 (Tech Sup. – ASC/SSD) - 1-866-894-0637 (Tech Sup. - FE/ME)
GSPN: http://gspn3.samsungcsportal.com/main.jsp
E-Learning: samsungasc.earlyconnect.com
MCP & E-Learning Support: **1-800-749-9421 – e-learning@sea.samsung.com**

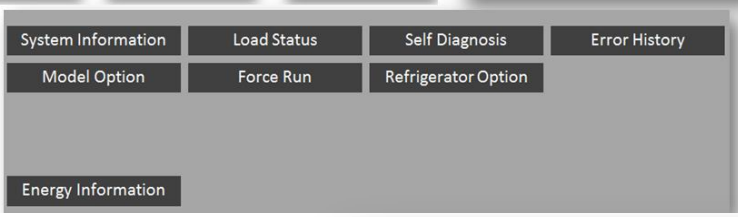
Fridge Manager widget allows adjustment of current fridge and freezer temp as well as special functions

Cooling Off Mode

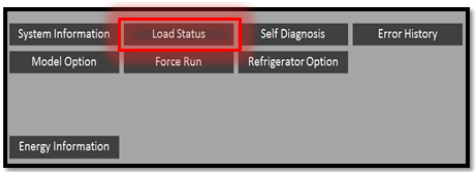
To shut off all cooling functions
Put the unit into Cooling off Mode
- In Fridge Manager Select Settings
- Select Cooling off (on or off)



Engineer Mode

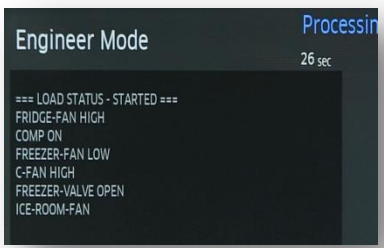


Load Status -Check for Errors



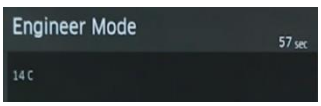
Load Status will show what components are currently running or activated on the Samsung Fridge

This mode is useful when troubleshooting communication signals

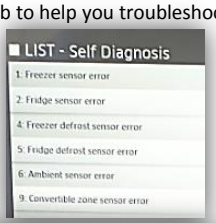


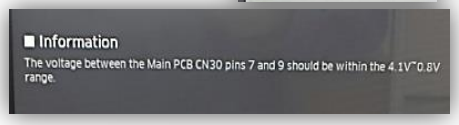
Self Diagnosis

When Self Diagnosis is pressed the unit will automatically check all internal components within 1min



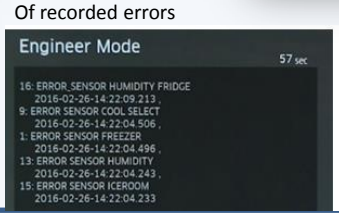
If an error is detected use the List of errors on the screen of the family hub to help you troubleshoot





Error History

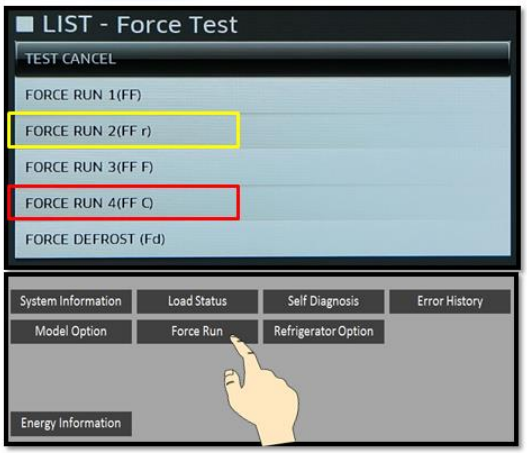
Error History will give you a full list Of recorded errors

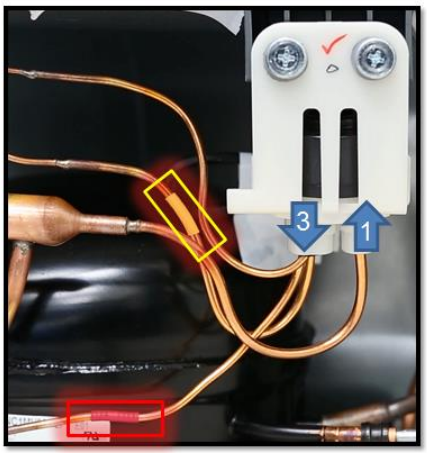


To clear the recorded errors click the button labeled "Clear Error List"

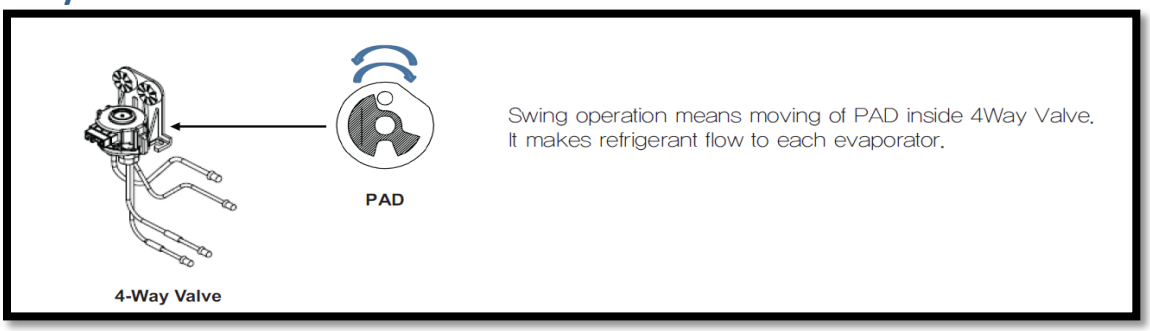
Force Run (Force mode)

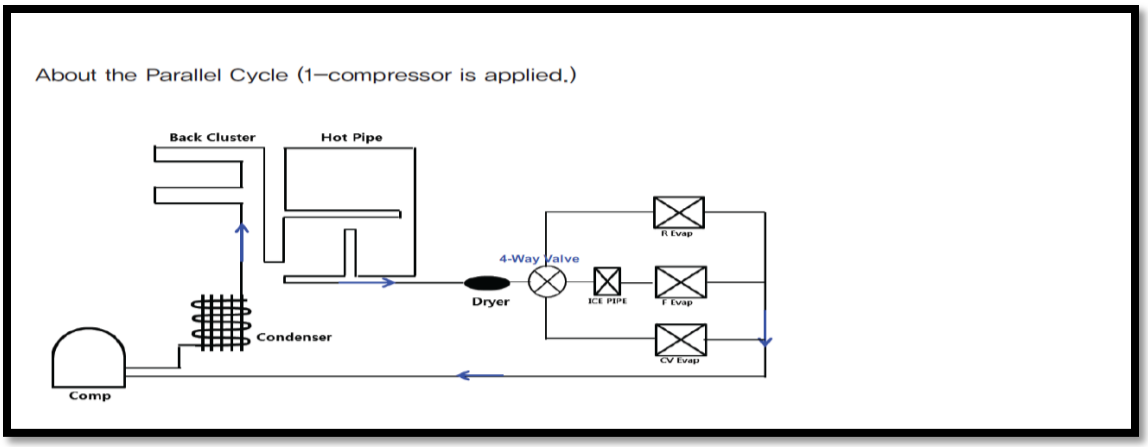
FF:	Comp Run and Valve in “Swing” mode (valve moves based on compartment sensor)
FFr:	Comp Run and Fridge Valve (Yellow) on
FFf:	Comp Run and Freezer Valve (No Color) on
FFc:	Comp Run and Convertible Zone Valve (Red) on
FD:	Forced Defrost (Compressor OFF)





TDM 4 Way Valve





About Natural Defrosting

- This is a technology that helps keep food fresh by raising the humidity in the refrigerator by removing frost that has formed on the evaporator by running the fan when the cooling operation is not being executed.

DC FAN MOTORS

Brushless DC Fan motors are used to save energy. The fans operate at two speeds. Fan speed information is read by the Main PCB. If the fan speed exceeds 600 RPM or the speed is too slow, or stopped the fan drive circuit is disabled, After 10 seconds the circuit tries again with 3 seconds of DC voltage If the fan continues this activity for 5 cycles, 10 seconds off 3 seconds on, the fan drive circuit is disabled for 10 minutes.

TO TEST THE FAN CIRCUIT VOLTAGE.

Power off and back on to check the DC voltage to the motor, wait from 10 to 60 seconds for the fan voltage to kick in, and then check fan voltage, the average reading is 9 VDC. If you get 3 seconds of voltage every 10 seconds for the 5 fan power up cycles, then the Main PCB is good.

NOTE: You may need to put unit in FORCED FREEZE mode to activate the fans/compressor.

If the fan blade is blocked by ice, then defrost and check the motor again, after removing power from the unit.

If the evaporator is ice blocked and thus blocking the air flow, the fan will over RPM and is stopped. Remove ice and check the motor again. If everything is clear around the fan blade then the motor would be at fault. Continuous fan errors will be displayed on the front panel display. **PLEASE NOTE:** The door switches control the evaporator fan motors. Have them closed to test the motors. Delay time 10 – 60 seconds.

Heat Release Ice Makers

Heat Release Ice production Explanation

Some time after the water fill is complete, the control board will check the temperature of the eject Thermistor, on the Ice Maker Head, if the Thermistor reads a temperature lower than 18.5 degrees for more than 5 seconds, then the ice production process is completed. The Ice maker will harvest if the ice bucket is not sensed as full. If a Fault Mode is detected with the Ice Maker operation, the Ice Maker stops working for 3 hours. Which means, the Ice Maker checks the operation every 3 hours until it works properly.

Heat Release I/M Test Mode

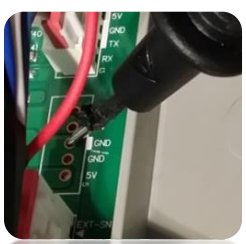
Press and hold the ICE TEST S/W for at least 1.5sec, the harvest function will start. If the ice maker Thermistor is below 0 degrees the Ice maker heater turns on for about 2 minutes. If the temperature exceeds 0 degrees, Ice maker heater turns on for 30 seconds. After the Ice maker heater turns on for 30 seconds, the heater turns off and then Ice maker harvest motor turns on. The motor will rotate in right direction for about 3 minutes, after this, water supply valve is turned on, then the valve is turned off, the test mode is completed. If the above operation is not carried out within 6 minutes, it will go into a fault mode.

FREEZER TEMPERATURE CONTROL BY THE ICE MAKER

Interior Temperature of the freezer will be set to -14 degrees Fahrenheit until the ice bucket is full. When the ice bucket is full, the freezer will maintain original set temperature. Also, whenever the ice is used, the freezer will again set to -14 degrees Fahrenheit. Selecting "Ice Off" will allow the freezer to be controlled by the set temperature. If water is not hooked up, the freezer will always be at –14 unless "Ice Off" is selected.

Temperature/Resistance/Voltage Chart for Samsung Refrigerators Sensors

Temp.	(Ω)	Volts	Temp.	(Ω)	Volts	Temp.	(Ω)	Volts	Temp.	(Ω)	Volts
-29.2°F	64227	4.326	1.4°F	28021	3.685	32.0°F	13290	2.853	62.6°F	6771	2.019
-27.4°F	61012	4.296	3.2°F	26760	3.64	33.8°F	12749	2.802	64.4°F	6521	1.974
-25.6°F	57977	4.264	5.0°F	25562	3.594	35.6 °F	12233	2.751	66.2°F	6281	1.929
-23.8°F	55112	4.232	6.8°F	24425	3.548	37.4 °F	11741	2.7	68.0°F	6052	1.885
-22.0°F	52406	4.199	8.6°F	23345	3.501	39.2 °F	11271	2.649	69.8°F	5832	1.842
-20.2°F	49848	4.165	10.4°F	22320	3.453	41.0°F	10823	2.599	71.6°F	5621	1.799
-18.4°F	47431	4.129	12.2°F	21345	3.405	42.8°F	10395	2.548	75.2°F	5225	1.716
-16.6°F	45146	4.093	14.0°F	20418	3.356	44.6°F	9986	2.498	77.0°F	5000	1.675
-14.8°F	42984	4.056	15.8°F	19537	3.307	46.4°F	9596	2.449	78.8°F	4861	1.636
-13.0°F	40938	4.018	17.6°F	18698	3.258	48.2°F	9223	2.399	80.6°F	4690	1.596
-11.2°F	39002	3.98	19.4°F	17901	3.208	50.0°F	8867	2.35	86.0°F	4218	1.483
-9.4°F	37169	3.94	21.2°F	17142	3.158	51.8°F	8526	2.301	87.8°F	4072	1.447
-7.6°F	35433	3.899	23.0°F	16419	3.107	53.6°F	8200	2.253	89.6°F	3933	1.412
-5.8°F	33788	3.858	24.8°F	15731	3.057	55.4°F	7888	2.205	91.4°F	3799	1.377
-4.0°F	32230	3.816	26.6°F	15076	3.006	57.2°F	7590	2.158	95.0°F	3547	1.309
-2.2°F	30752	3.773	28.4°F	14452	2.955	59.0°F	7305	2.111	96.8°F	3428	1.277
-0.4°F	29350	3.729	30.2°F	13857	2.904	60.8°F	7032	2.064	100.4°F	3204	1.213



Make sure before measuring voltage of any DC component that circuit ground is used. Any marked GND on the main PCB will be your circuit ground.
If Chassis ground is used, measurements will be incorrect.

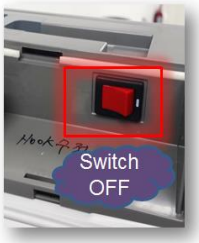
Sensor Res. > 100KΩ = Open

Sensor Res. <2KΩ = Shorted

A Sensor Resistance over 100K ohm is considered OPEN
A Sensor Resistance under 2K ohm is considered Shorted
But Note that a sensor could also give wrong values if it is out of tolerance

Removing Family Hub Display

Step 1: Turn off the Family Hub. The switch is under the cover at the top of the right door. Its important to Always shut off power to avoid damage



Step 2: Remove the screw and cover at the top of the door

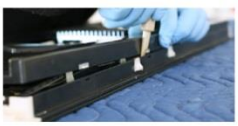
Step 3: Using a long magnetic screwdriver, carefully remove two screws

Step 4: Attach a suction cup to the Family Hub near the top. Carefully pull out the assembly (LCD Panel).

Avoid stretching the wiring too far, the harness or connector may become damaged if stretched too far.

Step 5: Remove the back cover from the assembly (LCD panel) and move the WI-FI module from the old assembly to the new assembly.

Screen will Slide off most surfaces
It needs to be protected



Testing Wi-Fi

1.

After replacing the Wi-Fi module do the following to confirm Wi-Fi is operating

- Select Settings
- Select Wi-Fi
- Select Wireless router

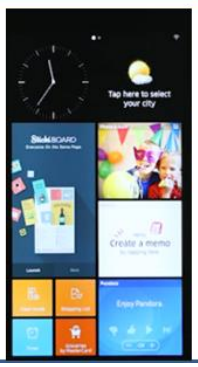
2.

Have the customer enter their Wireless password

3.

Check the Wi-Fi Icon and check apps are loaded

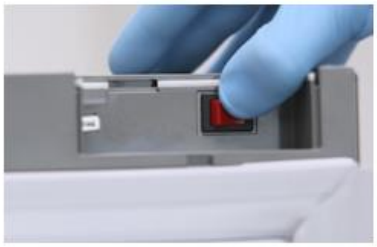
If not loaded check MAC address and Wi-Fi signals



No Power to Family Hub Screen or Blank Screen

1.

If No Power to the display, first shut off the power to the Display at the top of the door

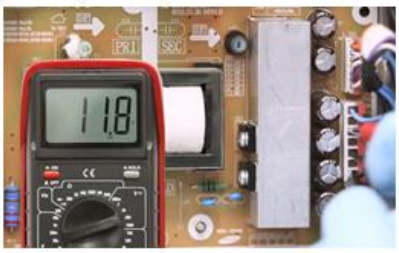


2.

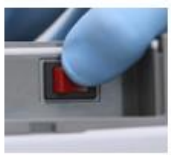
At the top of the door wire harness - Check each Black wire to each Blue wire for approx. 12V

3.

If 12V is not detected at the top of the door, check for 12V at the Power board (SMPS). If no voltage replace (SMPS)



4.



If all voltages are ok, turn the power switch off and remove the Family hub display. Next check for 12V at the connector. Test the power switch, power should drop to 0v when shut off
If voltage tests are OK –
Panel is defective

2016 Family Hub – Features TV Mirror

SAMSUNG

Step 1:

Make sure TV and Fridge are connected to the same Wi-Fi Network

TV should have the Wi-Fi Direct Feature

Step 2:

Select TV Mirror on the Fridge

This feature supports Samsung Smart TV's 6400 or higher model from 2015 or later

Step 3:

After Selecting the TV from the list go to the TV and allow the Fridge to connect to TV

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Removal of Ice Bucket and Ice Maker

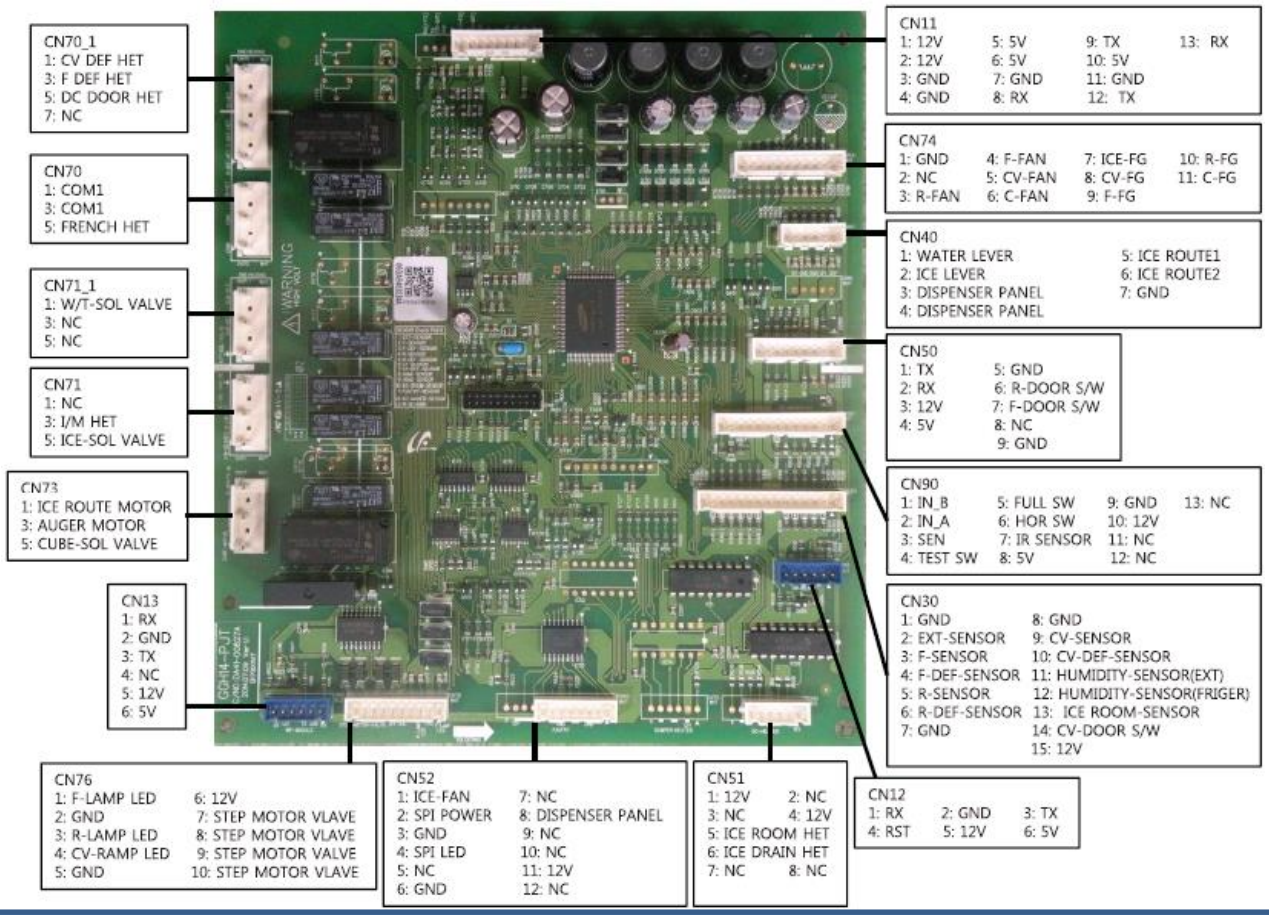
How To Do	Descriptive Picture
1. Wait for 5 minutes after manual defrost of freezer and fresh food compartments. (Reference of Forced Defrost method in troubleshooting)	
2. Lift up the Ice Bucket and pull it out.	
3. Remove the screw from the Wire Housing Cover.	
4. Remove the Wire Housing Cover.	
5. Disconnect the Ice Maker Housing Connector.	
6. Remove the screw from the Duct Tray-ice.	
7. With a flat blade screwdriver, push the duct to the right and remove it from the locking tab. (Refer to the image.)	
8. Push down the refrigerant pipe slightly and separate the refrigerant pipe and the Ice Maker Assembly completely.	
9. While pressing the Hook, pull out the Ice Maker.	
10. While pushing down the Duct-Tray-Ice, pull out the Ice Maker carefully and remove it.	

Removal of the Auger Motor Assy

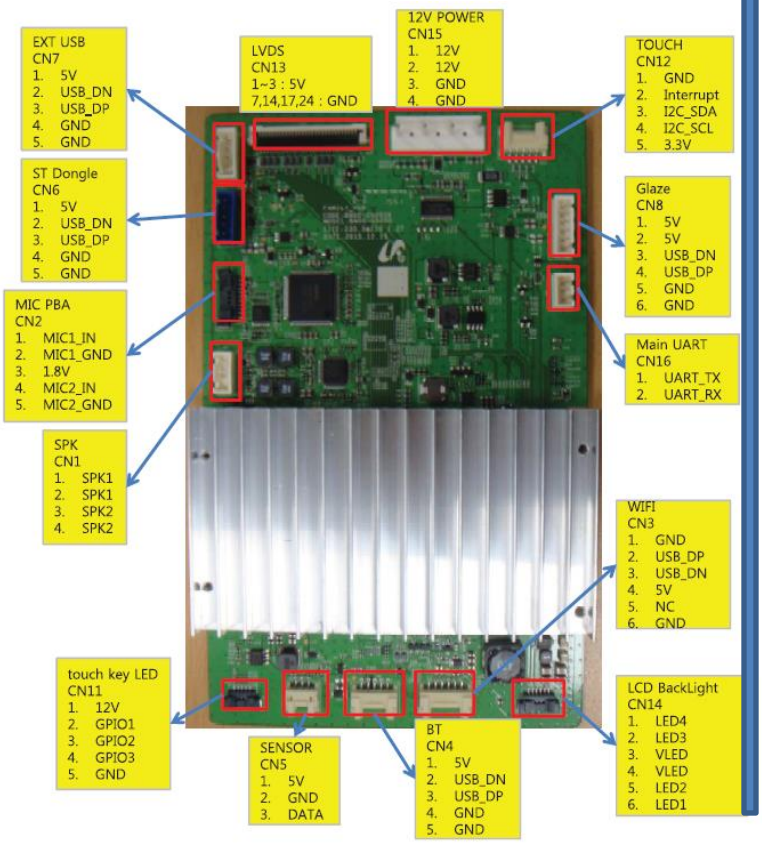
1. Disconnect the FAN-AUGER-ASSY Connector.	
2. Hold the Hook on the bottom of the FAN-AUGERASSY and lift it up to make it free from the Locking Tab.	
3. While lifting it up, take the FAN-AUGER-ASSY out of the Ice Maker Compartment.	

SMPS Board (Power Supply)

Main Board of Fridge Layout



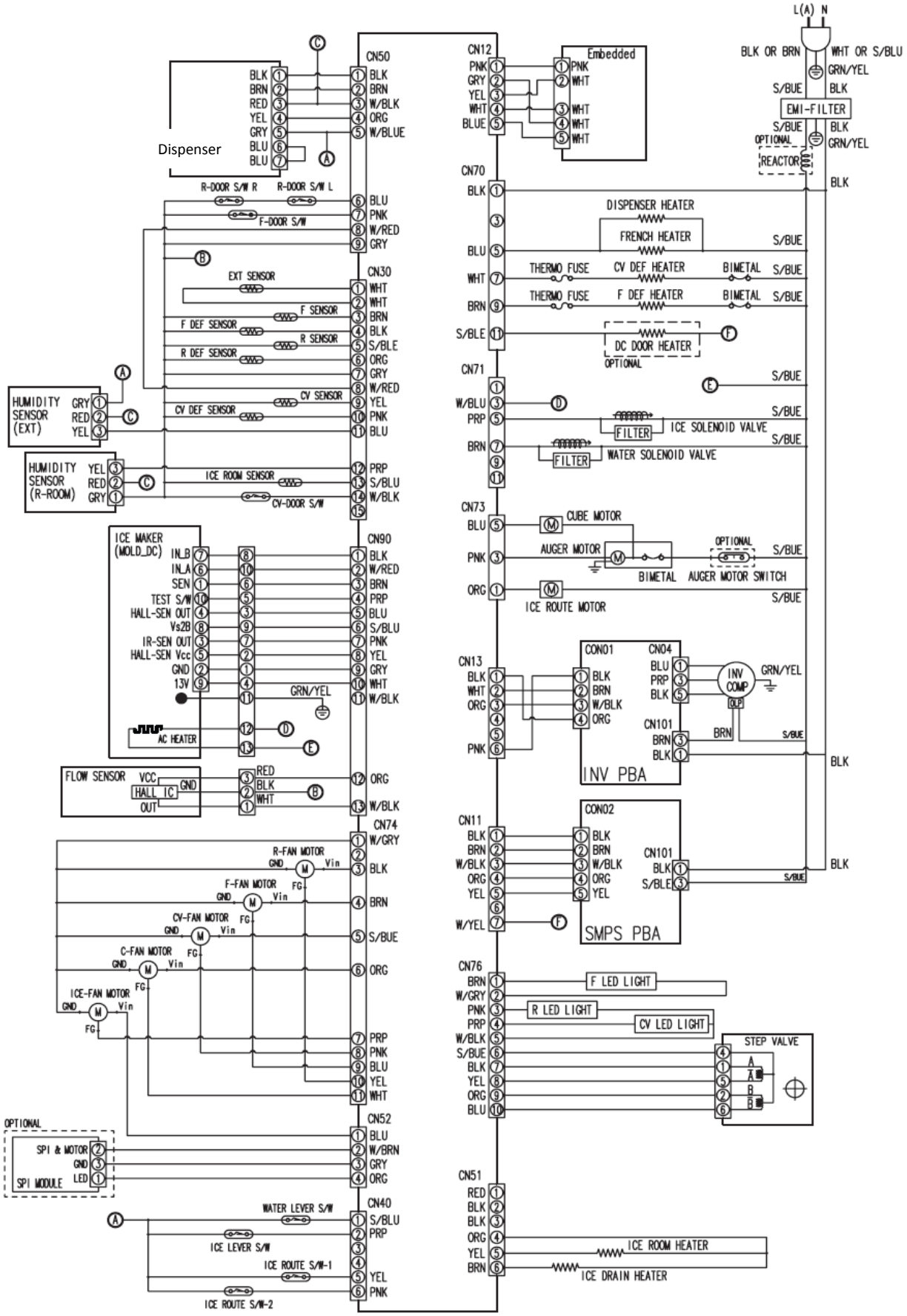
Main Board of Family HUB Screen



Inverter Board (Compressor)

1. 5V
2. GND
3. RPM
4. F/B
5. NC
6. PBA function
7. PBA function

Wiring Diagram



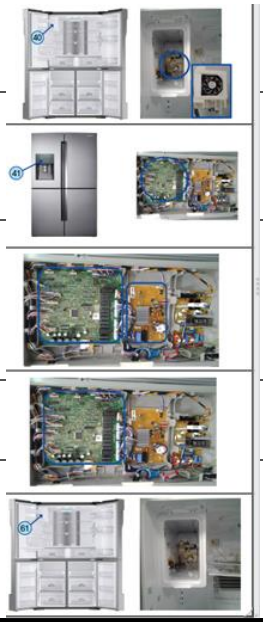
General

Symptom	Action
The front corners and sides become warm and form condensation.	• To prevent condensation from forming, the refrigerator has heat-proof piping in the front corners. If the ambient temperature rises, this equipment may not work effectively. This is not a system failure. • Make sure the door is closed properly. Condensation may form if you leave the door open for an extended period of time. • Condensation may form on the exterior surface of the refrigerator if humid air comes into contact with the cool surface of the refrigerator.
The ice maker does not make ice.	• If you have used all the ice in the ice bucket, you must wait for 12 hours for the refrigerator to make more ice. • See if the Ice Maker Off icon is lit. On the family hub under Fridge Manager, if off turn on • Make sure the freezer temp is set properly. • Make sure the water tank is filled with water. • Check if the ice bucket contains ice clumps. If it does, empty the ice bucket and try again.
The water dispenser is not functioning.	• Check if the water tank is frozen. If so, select a higher fridge temperature. • Make sure the water tank is filled with water. • Make sure the water tank is installed properly. • Make sure the water filter is installed properly.
You hear a bubbling sound.	• This is normal. The bubbling sound comes from refrigerant circulating through the refrigerator.
A bad smell comes from inside the refrigerator.	• Check for any spoiled food. We recommend cleaning the refrigerator on a regular basis and removing any spoiled or suspect food items. • Make sure strong smelling food is wrapped tightly or stored in air tight containers.
Frost forms on the interior walls.	• Make sure no food blocks the vents of the refrigerator. It is also important to arrange food items evenly for ventilation. • Make sure the door is closed properly.
Condensation forms on the interior walls or around vegetables.	• This happens when food containing a high proportion of water is stored uncovered, or the door has been left open for an extended period of time. • Make sure food is covered or put in sealed containers.

Samsung Smart Home - Troubleshooting

Symptom	Action
Could not find “Samsung Smart Home” in the app market.	• The Samsung Smart Home app is available for smartphones that run Android 4.0 (ICS) or higher, or iOS 7.0 or higher
The Samsung Smart Home app fails to operate.	• The Samsung Smart Home app is available on applicable models only. • The old Samsung Smart Refrigerator app cannot connect with Samsung Smart Home models.
The Samsung Smart Home app is installed but is not connected to my refrigerator.	• You must log into your Samsung account to use the app. • Make sure that your router is operating normally. • If the Wi-Fi icon on the refrigerator’s display is off, this indicates that no network connection has been established yet. In this case, use the Samsung Smart Home app to connect and register your refrigerator to the access point (AP) of your house.
Could not log into the app.	• You must log into your Samsung account to use the app. • If you don’t have a Samsung account, follow the app’s onscreen instructions to create one.
An error message appears when I try to register my refrigerator.	• Easy Connection may fail due to the distance from your access point (AP) or electrical interference from the surrounding environment. Wait a moment and try again.
The Samsung Smart Home app is successfully connected to my refrigerator but does not run.	• Exit and restart the Samsung Smart Home app, or disconnect and reconnect the router. • Unplug the power cord of the refrigerator, and plug it again after 1 minute.

ERROR NUMBER	Item	Diagnostic method	Location Image
1	Freezer sensor error	 Check if the Sensor is Open or Shorted The voltage between the Main PCB CN30 pins 1 and 3 should be within the 4.5V~1.0V range.	
2	Fridge sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 1 and 5 should be within the 4.5V~1.0V range.	
4	Freezer defrost sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 1 and 4 should be within the 4.5V~1.0V range.	
5	Fridge defrost sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 1 and 6 should be within the 4.5V~1.0V range.	
6	Ambient sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 1 and 2 should be within the 4.5V~1.0V range.	
9	Convertible zone sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 11 and 12 should be within the 4.1V~0.8V range.	
11	Convertible zone defrost sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 11 and 13 should be within the 4.1V~0.8V range.	
13	Humidity sensor error	The voltage between the Main PCB CN30 pins 7 and 9 should be within the 4.1V~0.8V range.	
14	Fridge Ice maker sensor error	Check if the sensor is open or shorted The voltage between MAIN PCB CN90 3↔ 8 should be within 4.5V~1.0V.	
15	Ice room sensor error	Check if the sensor is open or shorted The voltage between MAIN PCB CN30 10↔ 11should be within 4.5V~1.0V.	
16	Fridge humidity sensor error	Check if the sensor is open or shorted The voltage between the Main PCB CN30 pins 7 and 8 should be within the 4.1V~0.8V range.	
21	Freezer fan error	The voltage of the MAIN PCB CN74 1↔4: should be between 7V~12V.	
22	Fridge fan error	The voltage of the MAIN PCB CN74 1↔3: should be between 7V~12V.	
23	Comp room fan error	The voltage of the MAIN PCB CN74 1↔6: should be between 7V~12V.	
24	Freezer defrost error	After separating MAIN PCB CN70_1 wire from PCB, resistance value between CN70_1-7 ↔ 3 shall be 63(230) ohm ± 7%. (Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : wire/ bimetal open (Must power off)	

ERROR NUMBER	Item	Diagnostic method	Location Image
29	Convertible zone defrost error	After separating MAIN PCB CN70 wire from PCB, resistance value between CN70_1-7 ↔ 1 shall be 63(230) ohm ± 7%. (Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : wire/ bimetal open (Must power off)	
31	Convertible zone fan error	The voltage of the MAIN PCB CN74 1↔5: should be between 7V~12V.	
35	Freezer low regist	ERROR_Freezer low regist	
37	Convertible zone low regist	ERROR_Convertible zone low regist	
39	Ice maker function error	After changing the Ice Maker(R), plug the refrigerator power code again, and check the operation.	
40	Ice maker fan error	The voltage of MAIN PCB CN52-1↔ 6: shall be between 7V~12V	
41	MAIN < - > Panel Comm error	Actually, If there is not a problem, it is desirable to replace Main and Panel PCB With the oscilloscope after a cable problem confirming.	
44	MAIN < - > INV Comm error	Actually, If there is not a problem, it is desirable to replace Main and Inverter PCB With the oscilloscope after a cable problem confirming.	
46	I/O Expander Comm error	It is desirable to replace Main PCB.	
61	Ice duct heater error	After separating MAIN PCB CN51 wire from PCB, resistance value between CN51 4↔6 shall be 135 ohm ± 7%. (Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : (Must power off)	
65	Ice bucket heater error	After separating MAIN PCB CN51 wire from PCB, resistance value between CN51 4↔7 wire shall be 135 ohm± 7%. 0 ohm : heater short, ∞ Ohm : wire.	
66	Door handle heater error	After separating MAIN PCB CN51 wire from PCB, resistance value between CN51 1↔2 wire shall be 135 ohm± 7%. 0 ohm : heater short, ∞ Ohm : wire.	
71	Freezer abnormal temp. error	The temperature has been abnormally increased. Check if the door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a pre-determined period of time.	
72	Fridge abnormal temp. error	Check if the door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a pre-determined period of time.	
73	Convertible zone chill error	Check if the door has been open for a long time or if hot food has been stored in the compartment. If the reason for the error is removed, the error code disappears after a pre-determined period of time.	

ERROR NUMBER	Item	Diagnostic method	Location Image
81	COMP run error	Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check if the DC 15V output is less than 13.5V. Check the Comp and Cycle.	
82	COMP IPM fault	Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check if the DC 15V output is less than 13.5V. Check the Comp and Cycle.	
83	COMP current error	Check the compressor wire connections. Check the soldering status of the inverter PCB. (Check if any parts have short-circuited). Check the Comp and Cycle.	
84	COMP Motor stall	Check if the compressor and the Cycle is normal.Check the input voltage. Check the soldering of the inverter PCB. (Check if any parts have short-circuited.)	
85	COMP low voltage	Check the input voltage. (This error occurs when the input voltage is AC 106 V or lower.)	