

## Lutron Palladiom Thermostat Split System Control

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This application note provides instruction on design, wiring, commissioning, and testing the Palladiom thermostat solution with split (also known as “Dual”) HVAC system control. For example: A HomeWorks Palladiom thermostat controlling a VRF system for cooling and a radiant floor system for heating. The Palladiom thermostat solution can only control one source of heating and one source of cooling. The only exception to this limitation is a HomeWorks Palladiom thermostat and HVAC controller controlling a conventional system or heat pump that also includes an auxiliary forced-air heating source.

Split-system control is only available with the HomeWorks Palladiom thermostat solution. Split-system control is not available with the myRoom Palladiom thermostat.

**Important Note:** The Palladiom thermostat solution is neither able to control multiple HVAC systems for heating nor multiple HVAC systems for cooling. Incompatible examples include a radiant floor heat system and VRF heating via a “staged” control, or a radiant floor system and a Fan Coil Unit (FCU) heat source.

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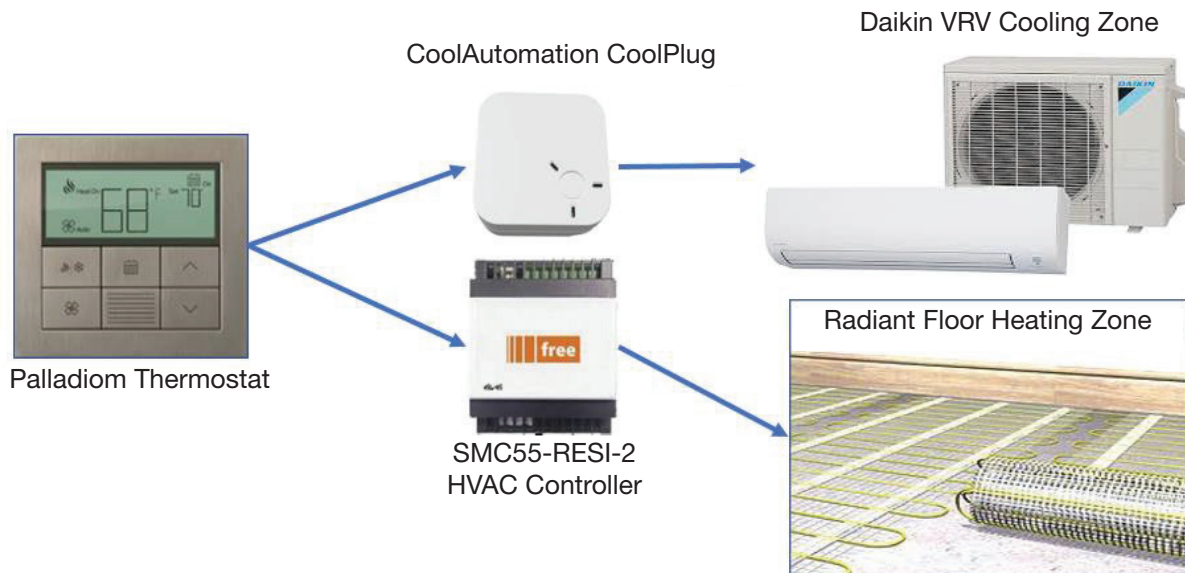
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## Design/Spec Considerations

Design and specify the split-system application, starting with the following steps:

1. Identify the heating system. Compatible options include (choose only one):
  - a. One radiant floor zone
  - b. One conventional heating system
  - c. One compressor-based heating system
  - d. One heating-only VRV/VRF system
  - e. One heating-only FCU system
2. Identify the cooling system. Compatible options include (choose only one):
  - a. One conventional cooling system
  - b. One compressor-based cooling system
  - c. One cooling-only VRV/VRF system
  - d. One cooling-only FCU system
3. Identify the controllers or interfaces required for the solution. Compatible controllers are as follows:
  - a. Lutron HVAC Controller (model SMC55-RESI-2) for FCUs, conventional systems, radiant floors, and compressor-based systems. See the [specification submittal for the Palladiom thermostat solution](#) for more information.
  - b. CoolAutomation interfaces, such as the CoolPlug, for Daikin VRV systems. See the [CoolAutomation application note #650](#) for more information.
  - c. Mitsubishi A1M interface for Mitsubishi VRF systems. See the [Mitsubishi application note](#) for more information.
  - d. LG PDRYCB500 interface for LG VRF systems. See the [LG application note](#) for more information.

The Palladiom thermostat will connect to both controllers or interfaces. An example of a split system with Daikin VRV for cooling and a radiant floor for heating is shown below:



## **Design/Spec Considerations (continued)**

### **Integration Control**

One exception to using a physical controller or interface connected to the thermostat for either heating or cooling is to send the setpoint and operating modes to an HVAC system via integration. In this application, only one interface or controller will be connected to the thermostat. Note that the integration control may only be used for heating or cooling (not both), and the other controller or interface must do only the opposite.

### **Temperature Sensing/Reporting Limitations and the Lack of Auto Mode**

The temperature sensor is disabled for any control option other than the SMC55-RESI-2 HVAC controller. For all other systems, the temperature must be sent to the thermostat via the HVAC system through the interface. Therefore, the HVAC system must have its own temperature sensor.

When using a split system control for heating and cooling, Auto mode is not available to the user. This means the user must choose “heating” or “cooling” as the mode, and the thermostat solution cannot automatically switch between heating and cooling based on the room temperature and setpoint.

### **Dehumidification and Humidification Limitations**

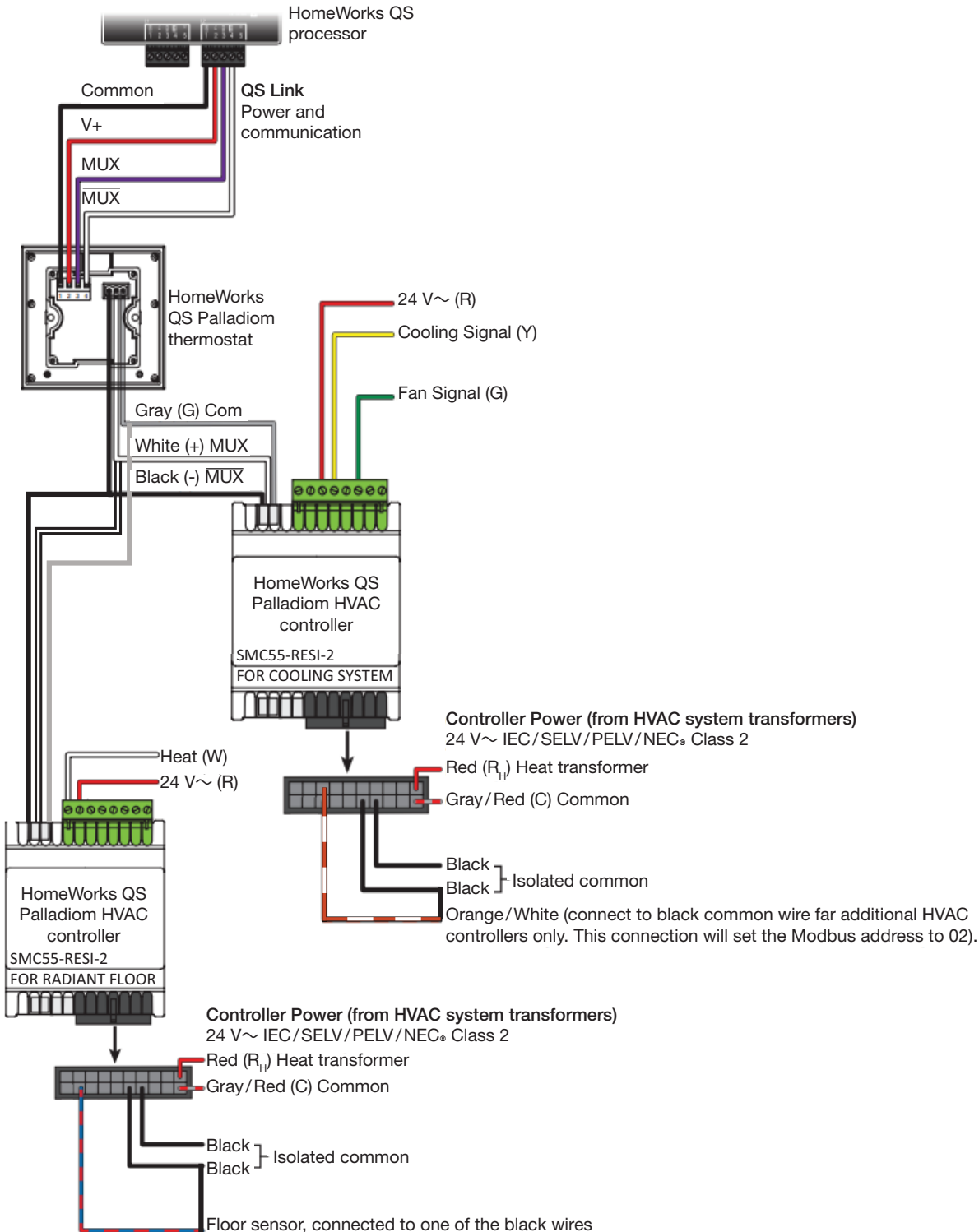
Dehumidifier or humidifier control is not available with the Lutron HomeWorks Palladiom thermostat solution.

Other limitations regarding humidity include:

- The Palladiom thermostat solution is unable to send a separate signal to activate a dehumidifier when the humidity is above a certain setpoint.
- The Palladiom thermostat is unable to send a separate signal to activate a humidifier when the humidity is below a certain setpoint, nor can it humidify the air using a fan coil unit.
- The Palladiom thermostat solution is unable to share the relative humidity level nor humidity setpoint to a third-party system via integration.

## Installation and Wiring

Mount and install the Palladium thermostat, controller(s), and interface(s) according to the [specification submittal for the Palladium thermostat](#) and instructions provided with the product. Wire the Palladium thermostat's HVAC communication link to both controller(s) and/or interface(s) in parallel. Also, connect the orange/white wire to one of the black wires on the second controller (if two SMC55-RESI-2 controllers are used in the application). The below example shows a Palladium thermostat solution controlling a radiant floor system for heating and a conventional system for cooling.

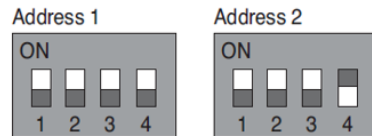
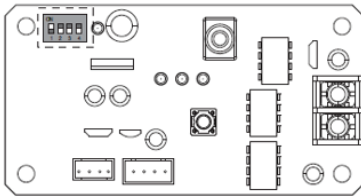


## Addressing the Controllers and/or Interfaces

The controllers and interfaces used for the split system will need different addresses on the HVAC communication link to function properly. By default, all controllers and interfaces mentioned in this application note have a default address of “1”, except for the CoolPlug, which has a default address of “99”.

If the application has two controllers or interfaces with the same default address, one of them must be modified to have a different address. The first controller or interface can remain unchanged and keep the default address. The second controller or interface must have its address changed. Follow the below instructions on how to change the address of the second controller or interface:

- SMC55-RESI-2:
  - On the 20-point harness of the SMC55-RESI-2 controller, connect the orange/white wire to either of the two black wires. Note that this must be done before the controller is powered on. The controller will detect these wires are connected and change its address to “2”.
- Mitsubishi A1M:
  - Follow the instructions “DIP Switch Configuration for A1M” found in [Lutron/Mitsubishi VRF application note #585](#).
- LG PDRYCB500:
  - Change the interface’s DIP switch configuration to address “2” by setting the switches to the following:



\*Status of switch



- CoolAutomation CoolPlug
  - The CoolPlug’s default address is “99”. Therefore, split system control with a CoolPlug and another controller or interface does not require either of the devices to change their default address. Two CoolPlug controllers are not allowed to connect to the same Palladium thermostat.

## Commissioning

### Thermostat Commissioning

Once the addressing step on the previous page is completed, the Palladiom thermostat may now be commissioned. Follow the instructions on page 2 of the Palladiom Thermostat Installation instructions.

In Equipment Configuration Mode (“EC” on the thermostat’s display), choose the parameter value according to your application:

- Select option “02” if two interfaces or controllers are wired to the Palladiom thermostat.
- Select option “03” if only one controller or interface is connected to the thermostat for controlling heating. For example, an SMC55-RESI-2 controls a radiant floor, while an integration through the HomeWorks processor is used to control the cooling.
- Select option “04” if only one controller or interface is connected to the thermostat for controlling cooling. For example, an CoolPlug controls a Daikin VRV system for cooling, while an integration through the HomeWorks processor is used to control the heating.

In HVAC Controller Mode (“CO” on the thermostat’s display), choose the address for each device connected to the thermostat. Note that the controller communication addresses were already configured in the Addressing section. In this mode, you are mapping the address of the thermostat to the type of equipment (heating or cooling).

The controller currently mapped to an address is identified by the thermostat showing a flame icon or snowflake icon in the top-left corner.

- Example: Split system control with an SMC55-RESI-2 controlling a radiant floor and a CoolPlug controlling a VRV cooling system.
  - When the flame icon is shown, select “01” (SMC controller) for parameter ID “01”. Then select “01” for parameter ID “02”, since the address of the SMC55-RESI-2 is “01”.
  - When the snowflake icon is shown, select “03” (CoolPlug) for parameter ID “01”. Then select “99” for parameter ID “02”, since the address of the CoolPlug is “99”.

Follow the rest of the steps in the instructions to complete the configuration process.

## Commissioning (continued)

### HomeWorks System Commissioning

In the HomeWorks commissioning software, do the following to configure the split system control:

1. Select the Palladiom Thermostat in the Controls tab.
2. Select: “Displays a split equipment HVAC zone”. In the example below, two SMC55-RESI controllers are used: One for heating and one for cooling.

Device Locations |  Auto-Create Loads | Expand all | Collapse all

Thermostat 1 (Master: 2 Zones)

Displays a split equipment HVAC zone ?

Type	Name	Model	Configuration
Thermostat	Palladiom HVAC Controller...	SMC55-RESI-2	Only Heat
Thermostat	Palladiom HVAC Controller...	SMC55-RESI-2	Only Cool

In the Equipment tab:

1. Add SMC55 controllers and/or 3rd party HVAC equipment
2. Select “Part of Split Equipment HVAC zone” when the device is selected
3. For configuration: Select Cool Only or Heat Only. In the example below, two SMC55-RESI controllers are used: One for heating and one for cooling.

Equipment Locations | Expand all | Collapse all

Palladiom HVAC Controller 001

Part of split equipment HVAC zone ?

Configuration: Only Cool

Palladiom HVAC Controller 002

Part of split equipment HVAC zone ?

Configuration: Only Heat

Zone Name	Areas	Operating Modes	Fan Speeds	Assigned Devices
Area 001 HVAC Zone 001	tstat	Off,Cool	Auto,On,High,Medium,Low	Area 001 ▶ Thermostat 1(Ma
Area 001 HVAC Zone 002	tstat	Off,Heat,Only Auxiliary Heat	Auto,On,High,Medium,Low	Area 001 ▶ Thermostat 1(Ma

In the case of a third-party controller, such as a CoolPlug:

1. Under the Equipment tab:
  - a. Select 3rd Party HVAC

3rd Party HVAC 001

Part of split equipment HVAC zone ?

Configuration: Only Cool

Zone Name	Areas	Operating Modes	Fan Speeds	Assigned Devices
Area 001 HVAC Zone 003	tstat	Off,Cool	High,Medium,Low	Area 001 ▶ Thermostat 2(Master: 2 Zones)

Manufacturer: Cool Automation

Model: Cool Plug

Setpoint Type: Single

Connection: HVAC Controller

Lastly, go back to the Controls tab and assign HVAC zones to the thermostat.

## Testing/Confirming Functionality

After commissioning is complete, test functionality by choosing heat mode on the Palladiom thermostat by pressing the mode button until you see the flame icon. Next, raise the setpoint, then confirm the heating activates.

To test cooling, choose cooling mode (snowflake icon) on the thermostat and confirm the cooling system activates. Test the fan control as well (if applicable) by pressing the “fan” button.

## Troubleshooting

If cooling or heating is not activating, follow the below steps to troubleshoot the system.

- Confirm all devices are powered on.
- Confirm the communication link (black, gray, and white) wires are connected correctly to the controllers or interfaces. Follow the application notes and instruction guides associated with the devices.
- Confirm the controllers and/or interfaces have different addresses. Reference the Addressing section in this document.
- Confirm the correct addresses were mapped to the controllers and/or interfaces. Follow the Thermostat Commissioning section in this document.

If the “E1” error message shows on the thermostat, along with snowflake icon:

- The device is unable to communicate with the controller connected to the cooling zone. Verify wiring, address selection menu, and ensure the controller is powered on.

If the “E1” error message shows on the thermostat, along with flame icon:

- The device is unable to communicate with the controller connected to the heating zone. Verify wiring, address selection menu, and ensure the controller is powered on.



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## Lutron Contact Numbers

### WORLD HEADQUARTERS

**USA**  
Lutron Electronics Co., Inc.  
7200 Suter Road  
Coopersburg, PA 18036-1299  
TEL: +1.610.282.3800  
FAX: +1.610.282.1243  
support@lutron.com  
www.lutron.com/support

**North & South America  
Customer Assistance**  
**USA, Canada, Caribbean:**  
1.844.LUTRON1 (1.844.588.7661)  
**Mexico:**  
+1.888.235.2910  
**Central/South America:**  
+1.610.282.6701

### UK AND EUROPE:

Lutron EA Limited  
125 Finsbury Pavement  
4th floor, London EC2A 1NQ  
United Kingdom  
TEL: +44.(0)20.7702.0657  
FAX: +44.(0)20.7480.6899  
FREEPHONE (UK): 0800.282.107  
Technical Support: +44.(0)20.7680.4481  
lutronlondon@lutron.com

### ASIA:

Lutron GL Ltd.  
390 Havelock Road  
#07-04 King's Centre  
Singapore 169662  
TEL: +65.6220.4666  
FAX: +65.6220.4333  
Technical Support: 800.120.4491  
lutronsea@lutron.com

### Asia Technical Hotlines

Northern China: 10.800.712.1536  
Southern China: 10.800.120.1536  
Hong Kong: 800.901.849  
Indonesia: 001.803.011.3994  
Japan: +81.3.5575.8411  
Macau: 0800.401  
Taiwan: 00.801.137.737  
Thailand: 001.800.120.665853  
Other Countries: +65.6220.4666