PROLON

FOCUS GUIDE

DIGITAL THERMOSTAT

Configuration Guide for Prolon Focus Software

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1 - Prolon Focus Software

This guide will describe in detail the operating sequences and configuration variables used by the Prol*on T1100 Digital Thermostats*.

The Prolon T1100 is a multi-purpose heating and cooling networkable digital thermostat. The built-in microprocessor offers precise digital control to maximize performance. The available outputs and control sequences are fully configurable, either locally from the touchpad or remotely. The elegant circular touch pad allows for intuitive setpoint adjustment and configuration via simple scrolling, tapping and holding motions. The versatile graphic display makes configuration simple and efficient with animated menu navigation, icons and helpful popup tips.

When in a network, the *T1100 Digital Thermostats* can share information such as the occupancy state, the demand and more.

The Prolon series *T1100 Digital Thermostat* is in essence a collection of zone control sequences designed by Prolon, based on the feedback of our trusted clients and contractors with years of field experience. The sequences offered are highly configurable, allowing for a greater flexibility in the final operation of the controller, but they are not programmable.

The T1000 has the following hardware features:

- **1 Analog Input**
- **1 Digital Output**
- **1 Analog Output**
- **LCD Screen**
- **Touchpad**

2 - Networking

Prolon's *T1100 Digital Thermostats* can work completely independently, but can also be integrated into a network with other types of Prolon controllers, where they will share and exchange information for a more effective overall system. Prolon's default method of network communication is Modbus RTU over RS485.

2.1 - Shared Information

When a ***T1100 Digital Thermostat*** is networked with a Prolon Master Controller (such as a rooftop controller), it will be automatically detected and start sharing information. Here is the list of current Prolon Master Controllers:

- Rooftop Controller (RTU)
- Heatpump Controller (HP)
- Air Make Up Controller (MUA)
- Hydronics Controller (HYD)

The Prolon Network Controller is a special case, as it acts as a link between all Master Controllers, so it will be treated in a class on its own.

The following tables summarize the information shared between ***T1100 Digital Thermostats***, Prolon Master Controllers, and the Prolon Network Controller. This information is exchanged approximately every three seconds for Master Controllers, and every ten to thirty seconds for the Network Controller. If the information stops being received, it will be declared invalid after 720 seconds.

Note that these tables apply to the most recent firmware revision of Prolon controllers, and may not accurately represent all older firmware revisions.

2.1.1 - Network Information Received

	Automatically received from Master	Can be received from Master (Configurable)	Can receive from NC (Configurable)
Outside Temperature	X		X
Occupancy	X		X
Morning Warmup Override		X	
Outside Temp Override		X	
Results of Math Functions	X		

Figure 1 - Information Received from the Network

DESCRIPTION

- **Outside Air Temperature**: The outside air temperature will automatically be shared from the Master Controller to the ***T1100 Digital Thermostats***. A Network Controller can also be configured to share the outside temperature with a ***T1100 Digital Thermostat*** should a Master Controller not be present. In the case where both are present, the last received outside temperature value will be used.

- **Occupancy**: The occupancy status will automatically be shared from the Master Controller to the ***T1100 Digital Thermostats***. A Network Controller can also be configured to share the occupancy status with a ***T1100 Digital Thermostat*** should a Master Controller not be present. In the case where both are present, the occupancy status received from the Network Controller will take priority.

- **Morning Warm-Up Override**: When a Master Controller becomes occupied, it can be configured to command ***T1100 Digital Thermostats*** to deactivate their heating outputs. This is typically useful for Gas Heating applications.

- **Outside Temp Override**: A Master Controller can be configured to command ***T1100 Digital Thermostats*** to activate or deactivate their outputs based on outside temperature conditions.

- **Results of Math Functions**: A Master Controller is continuously calculating the overall demand of the building using configurable mathematical operations, in a process called Flexi-Zone. The results of these functions can be redistributed to ***T1100 Digital Thermostats*** to control their outputs. This effectively allows a single T1100 to control an output not only based on its own demand, but on that of the average demands of other controllers in the building.

2.1.2 - Network Information Sent

	Automatically sent to Master
Zone Demand	X
Group Codes & Weights	X
Local Occupancy Override	X

Figure 2 - Information Sent to the Network

DESCRIPTION

- **Zone Demand**: Each ***T1100 Digital Thermostat*** continuously calculates the demand for its zone. This demand takes the form of a number varying from -100% to +100%, where a negative percentage indicates a cooling demand, and a positive number indicates a heating demand. A demand of zero indicates that the controller is within its zone temperature setpoints and is satisfied. This demand is periodically sent to the Master controller who, along with the demands of other controllers, will use it to generate an overall building demand in a process called Flexi-Zone. The result of this process allows the Master unit to activate heating or cooling equipment based on an average demand instead of being driven by a single thermostat.

- **Group Codes & Weights**: As part of the Flexi-Zone system, each ***T1100 Digital Thermostat*** can be assigned to different groups and can have different voting weights within these groups. With this information, a Prolon Master can control building equipment with the demands generated by zones in quasi-infinite variations. ***See Group Codes for more details.***

- **Local Occupancy Override**: During unoccupied mode, a user can override a T1100 back into occupied mode using the touchpad. The **T1100 Digital Thermostat** will communicate this override status back to the Master Controller so that the Master can decide to activate the fan or other equipment.

3 - Adding a T1100 Digital Thermostat to a Focus Project

Prolon Focus is a free visualization and configuration software for all Prolon controllers. Once the *T1100 Digital Thermostat* has been physically wired to a Prolon network, it's time to add this controller to your Focus project.

3.1 - Assigning Addresses

The Prolon ***T1100 Digital Thermostat's*** address can be assigned via the touchpad by navigating to the Address Menu. By default, this address is set to 101. Please refer to the HARDWARE GUIDE for more information.

3.2 - Adding the Thermostat to the Screen

Once the thermostat has been physically wired to a Prolon network and it has an assigned address, it is time to add it to your Prolon Focus project screen.

3.2.1 - Master Get List

If the ***T1100 Digital Thermostat*** is placed under a Master Controller in the network hierarchy, it can be added to your screen simply by performing a GET LIST on the Master. The Master Controller will take charge and scan its network for controllers, and all those that are found will automatically be added to the screen. To perform a GET LIST, right-click on your Master icon and select "Get List":

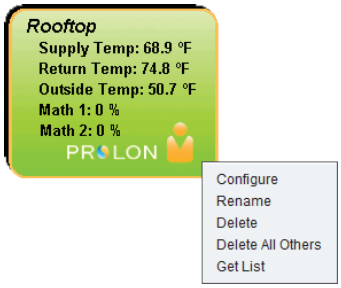


Figure 3 - Master Get List

Note that this step is **crucial**, as no communication will reach your ***T1100 Digital Thermostat*** if it has not been added the Master's List. If no Master controller is assigned to the ***T1100 Digital Thermostat***, then this step can be ignored, and the new Thermostat button can be used instead (see next page).

3.2.2 - New Thermostat Button

In the event where there is no Master Controller assigned to the ***T1100 Digital Thermostat*** in the network hierarchy, then a ***T1100 Digital Thermostat*** can be simply added onto the screen by clicking on the "New Thermostat" button, found in the Devices Drag and Drop list on the left side of the Focus screen (System View only):

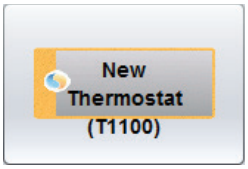


Figure 4 - New Thermostat Button

Focus will ask for the address of the controller, attempt to locate it, and add it on the screen if successful.

Alternatively, you can add multiple ***T1100 Digital Thermostats*** in sequence by right clicking the button and selecting the "Create Multiple" option. This option will facilitate the creation of multiple ***T1100 Digital Thermostats*** in sequential order.

4 - T1100 Digital Thermostat Icon

Each *T1100 Digital Thermostat* added to your system has its own icon. Each icon displays data about the *T1100 Digital Thermostat* it represents, and this data is updated regularly. You can open the configuration screen for a *T1100 Digital Thermostat* by double-clicking on its icon. If the *T1100 Digital Thermostat* is offline, all data values will show "N/A" (not applicable).

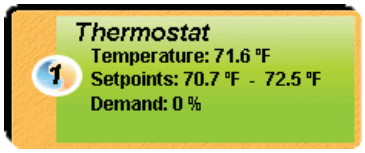


Figure 5 - Typical T1100 Digital Thermostat Icon

4.1 - Icon Data

- **Name**: The name of the ***T1100 Digital Thermostat***. You can change it by right clicking the icon and choosing "Rename". By default it is set to "Thermostat".
- **Address Number**: This can be seen in the blue and orange circle (yin/yang) at the left side of the icon.
- **Temperature**: The current zone air temperature. Will display "N/A" when no auxiliary temperature sensor attached (if enabled) or if offline.
- **Setpoints**: The active heating and cooling setpoints, respectively. Will display "N/A" if the ***T1100 Digital Thermostat*** is offline.
- **Demand**: The ***T1100 Digital Thermostat*** continuously calculates the demand for its zone. This demand takes the form of a number varying from -100% to +100%, where a negative percentage indicates a cooling demand, and a positive number indicates a heating demand. A demand of zero indicates that the controller is within its zone temperature setpoints and is satisfied. Will display "N/A" if the ***T1100 Digital Thermostat*** is offline.

4.2 - Icon Colors

The icons change color depending on their status and demand.

- **Grey**: The icon is grey if working offline or if the communication with that ***T1100 Digital Thermostat*** is lost. All data will be seen as "N/A".
- **Green**: The icon is green when the demand is within the deadband (between 5% cooling and 5% heating).
- **Red**: The icon turns red when the demand is greater than 10% HEATING, and stays red until the demand returns to 0%.
- **Blue**: The icon turns blue when the demand is greater than 10% COOLING, and stays blue until the demand returns to 0%.

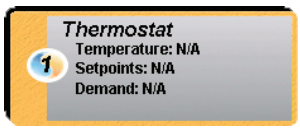


Figure 6 - Grey Icon

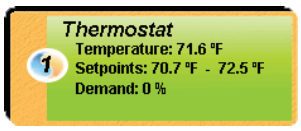


Figure 7 - Green Icon

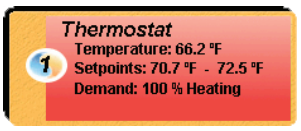


Figure 8 - Red Icon

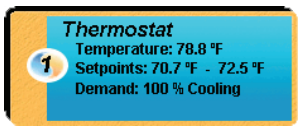


Figure 9 - Blue Icon

4.3 - Icon Right-Click

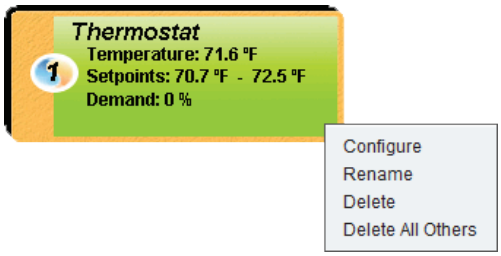


Figure 10 - Icon Right Click Menu

- **Configure**: Opens the configuration screen for the ***T1100 Digital Thermostat***.
- **Rename**: Allows you to rename this ***T1100 Digital Thermostat***. Names are limited to 16 characters.
- **Delete**: Removes this ***T1100 Digital Thermostat*** from your Focus Project.
- **Delete All Others**: Removes all other Icons from the current system. This is useful for debugging purposes, for example when trying to exclusively establish communication with this controller, and the presence of the other controllers in your project is causing communications to slow down.

5 - Configuration of a T1100 Digital Thermostat

To view the configuration of a *T1100 Digital Thermostat* in detail, double-click on its icon to see its configuration screen. Use the menus in the top left corner to navigate between the different sections, or simply double-click any item in the *T1100 Digital Thermostat* Home screen to transfer you to its corresponding page. ***(See Icon Quick Jumps for more details, p.13.)***

5.1 - T1100 Digital Thermostat Home Screen

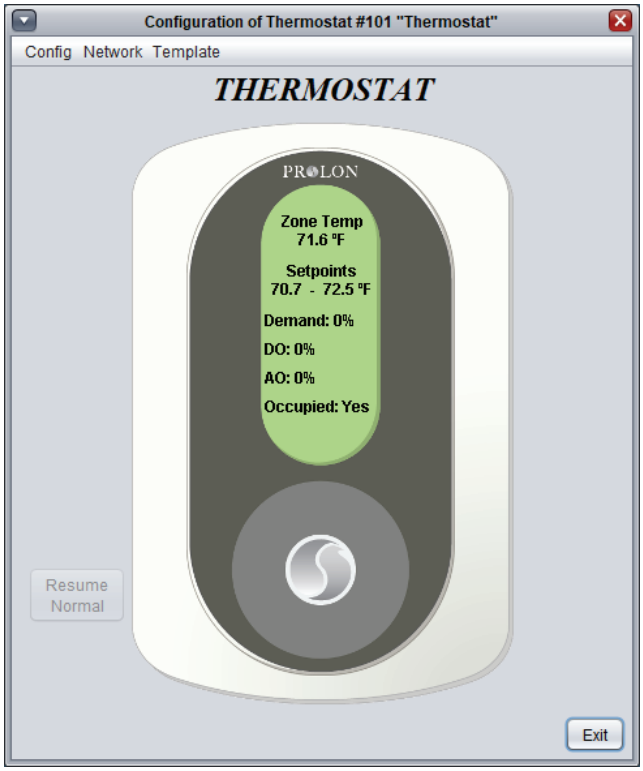


Figure 11 - T1100 Digital Thermostat Home Screen

This screen shows the status of all inputs and outputs of the ***T1100 Digital Thermostat***, as well as the active setpoints. All values will be "N/A" (Not Applicable) when offline.

5.1.1 - Displayed Information — Inputs

- **Zone Temperature**: The actual temperature read from the temperature sensor input, or as provided by the digital thermostat. Will be "N/A" if no sensor is attached.
- **Active Heating Setpoint**: This is the heating setpoint currently used by the ***T1100 Digital Thermostat***. In occupied mode, it corresponds to the setting that the user sets using the touchpad, once the setpoints limits have been applied. In unoccupied mode, the heating setpoint is reduced by the unoccupied heating offset ***(see p.15)***.

- **Active Cooling Setpoint**: This is the cooling setpoint currently used by the ***T1100 Digital Thermostat***. In occupied mode, it corresponds to the sum of the active heating setpoint and the occupied deadband. In unoccupied mode, the cooling setpoint is increased by the unoccupied cooling offset ***(see p.15)***.

- **Demand**: The ***T1100 Digital Thermostat*** continuously calculates the demand for its zone. This demand takes the form of a number varying from -100% to +100%, where a negative percentage indicates a cooling demand, and a positive number indicates a heating demand. A demand of zero indicates that the control ler is within its zone temperature setpoints and is satisfied.

- **Occupied/Unoccupied**: The current occupancy status of the ***T1100 Digital Thermostat***. When offline, it displays "Unoccupied".

- **Slab Temp**: The slab temperature in degrees Celsius or Fahrenheit. Will display N/A if no sensor is attached. Will not be visible if there are no outputs set with the Radiant Floor Special Function ***(p.20)***.

5.1.2 - Displayed Information — Outputs

- **DO**: The current action of the digital output in percentage. Any value between 1% and 99% means the output is pulsing with a pulse width modulation equal the percentage value. When pulsing, the output uses a 1 second pulse period.

- **AO**: The current action of the analog output in percentage. The percentage represents the voltage at the output, with a maximum of 10 VDC (ex.: 50% = 5 VDC), unless the output is set to Pulsed, in which case the output will pulse 0-10 VDC with a pulse width modulation equal to the percentage value. When pulsing, the output uses a 1 second pulse period.

5.1.3 - Icon Quick Jumps

Certain items in the Home screen will direct you to their corresponding configuration screen when double-clicked. A red contour will surround the object if this feature is available.

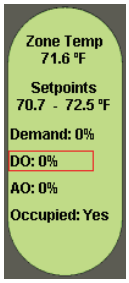


Figure 12 - Icon Quick Jump Example

The following is a list of the featured items and their corresponding destination:

ITEMS	QUICK JUMP
Zone Temp	Temperature Calibration
Setpoints	Temperature Configuration
DO	Digital Output Configuration
AO	Analog Output Configuration
Slab Temp*	Radiant Floor Configuration

** Visible only when the appropriate features are enabled*

Please note that if the advanced password is enabled, you will not be able to double-click on any objects, except the Setpoints.

5.1.4 - Icon Manual Override

Certain components of the ***T1100 Digital Thermostat*** can be overridden. To use this feature, right-click on the item of the component you wish to override. A pop-up menu will appear if this feature is available.

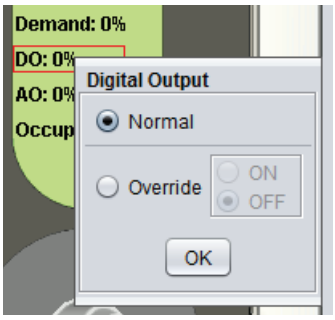


Figure 13 - Manual Override of the Digital Output

- **Normal**: Selecting the "Normal" button will revert the selected item back to its normal automatic behavior. Any override applied to this object will be disabled.

- **Override**: Selecting the "Override" button will allow the user to manually override the selected object until the normal mode is resumed. The following is a list of all items that can be overridden:
  - ▹ **Digital Output**: Writing an override value between 1% and 99% causes the output to pulse at that PWM.
  - ▹ **Analog Output**
  - ▹ **Occupancy**: Generally, all controllers will assume the same occupancy status as the master. If the master is overridden to "unoccupied", setting a zone to "occupied" will also force the master to be occupied. All others zones will remain unoccupied.

When an override is applied to an object, any associated text starts to flash. Please note that if the advanced password is enabled, or if you are offline, you will not be able to override any objects.

All overrides are removed when the ***T1100 Digital Thermostat*** is reset or loses power.

5.1.5 - Resume Normal Button

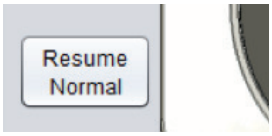


Figure 14 - "Resume Normal" Button

This button allows the ***T1100 Digital Thermostat*** to return to its fully automated behavior. All overrides previously applied to the ***T1100 Digital Thermostat*** will be disabled. However, before any action is taken, a dialog box will appear to confirm your choice.

5.2 - Temperature Configuration

This section is used to configure the zone setpoints and the PI control loop that determine the demand.

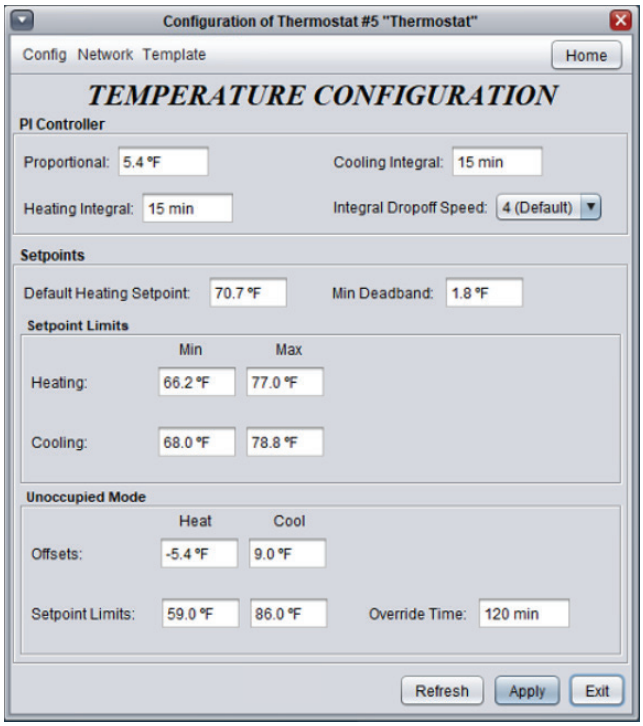
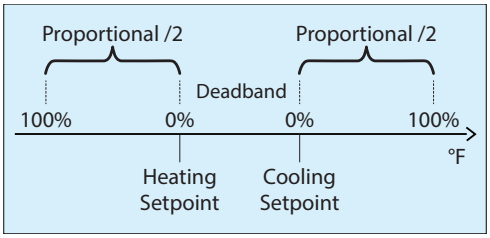


Figure 15 - Temperature Configuration Screen

5.2.1 - PI Controller

The ***T1100 Digital Thermostat*** continuously calculates the demand for its zone. This demand takes the form of a number varying from -100% to +100%, where a negative percentage indicates a cooling demand, and a positive number indicates a heating demand. A demand of zero indicates that the controller in within its zone temperature setpoints and is satisfied.

In PI loop control, as is used by the Prolon ***T1100 Digital Thermostat***, the demand is calculated by adding the proportional component of the demand to the integral component. These components are determined as follows:



- **Proportional**: Defines the proportional band used by the ***T1100 Digital Thermostat*** to calculate the proportional component of the demand. Please refer to the following image. Setting this value to zero removes proportional control, and consequentially, integral control. Demand will always be zero.

Default	5.4 °F / 3 °C

- **Cooling Integral**: Defines the amount of time required for the cooling integral component of the demand to equalize the proportional component. Setting this value to zero removes the cooling integral component of the demand.

Default	15 mins

- **Heating Integral**: Defines the amount of time required for the heating integral component of the demand to equalize the proportional component. Setting this value to zero removes the heating integral component of the demand.

Default	15 mins

- **Integral Dropoff Speed**: This setting defines how quickly the accumulated heating or cooling integral component of the PI calculation will be eliminated once the zone temperature returns within the setpoint deadband. The setting is provided on a scale of 1 to 5, with 1 being the slowest. Slowing down this setting can be useful in zones which have a strong constant heating or cooling load, which may make it advantageous to keep the zone demand ON even though the setpoints have been met.

Default	4

5.2.2 - Setpoints

- **Default Heating Setpoint**: This is the value that will be used as the heating setpoint. The Setpoint Limits (below) are then applied, resulting in the active heat setpoint.

Default	70.7 °F / 21.5 °C

- **Occupied Deadband:** The deadband between the occupied heating setpoint and the occupied cooling setpoint. The cooling setpoint is calculated by adding this deadband to the heating setpoint.

Default	1.8 °F / 1 °C

- **Setpoints Limits**: These are the limits that are applied to the default setpoints determined above to effectively limit the range of setpoints available for this zone. This will result in the 'active' heating and cooling setpoints for occupied mode.
  - ▹ Minimum Heating Setpoint

Default	66.2 °F / 19 °C

  - ▹ Maximum Heating Setpoint

Default	77 °F / 25 °C

  - ▹ Minimum Cooling Setpoints

Default	68 °F / 20 °C

  - ▹ Maximum Cooling Setpoints

Default	78.8 °F / 56 °C

5.2.3 - Unoccupied Mode

- **Offsets**: The setpoints calculated for occupied mode (after applying the setpoint limits) are offset by these amounts during unoccupied mode.
  - ▹ Heating

Default	-5.4 °F / -3 °C

  - ▹ Cooling

Default	9 °F / 5 °C

- **Setpoint Limits**: Once the unoccupied setpoints are calculated, they are then limited by the following values:
  - ▹ Heating

Default	59 °F / 15 °C

  - ▹ Cooling

Default	86 °F / 30 °C

- **Override Time**: This is the amount of time spent in occupied mode once the device is overridden from unoccupied mode after activating the override sequence on the thermostat.

Default	120 mins

5.3 - Outputs Configuration

These screens are used to configure the operation of the outputs for the thermostats. The ***T1100 Digital Thermostat*** has a digital output and an analog output.

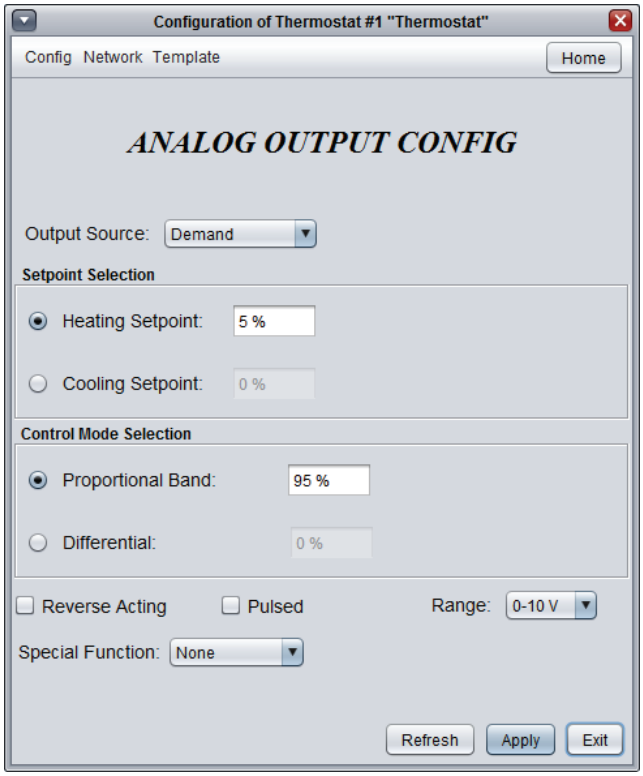


Figure 16 - Analog Output Configuration Screen

Output Source: Establishes the rules behind the outputs operation.

- **Demand**: The output behavior is based on this ***T1100 Digital Thermostats*** own demand. ***Please see section 5.2.1 for more information on zone demand***.
- **Occupancy**: The output will turn ON when occupied and OFF when unoccupied.
- **Occ / Night Heat**: The output will turn ON when occupied and OFF when unoccupied. In unoccupied mode the output will also turn ON when there is a heating demand greater than 25%, and will stay ON until the demand goes back to 0%.
- **Discharge Ctrl**: The output will be used to control the discharge air temperature setpoint. ***NOTE***: a discharge air sensor must be connected to the Auxiliary Input (see T1100 Hardware Guide)
- **Math 1 to 5**: The output's behavior is based on the chosen math function. In a standard Prolon Modbus network, these math functions are obtained from the network master and are traditionally the resulting average demands of different controllers on the network.
- **Off**: The output remains inactive and will be displayed as N/A on the *Home screen*.

5.3.1 - Setpoint Selection

If the Output Source above is set to 'Demand' or 'Math', then this determines if the output will activate under heating or cooling conditions. This also specifies the setpoint for the output, but the final operational sequence will depend on the Control Mode Selection below.

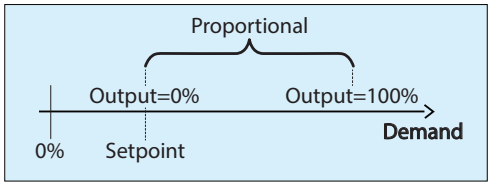
5.3.2 - Control Mode Selection

- **Proportional Band**: Selecting *Proportional Band* control will incrementally increase or decrease the output's value over time. This mode provides better control than traditional differential style outputs (ON/OFF), but can only be used with equipment that can accept a modulating signal.

  For digital outputs, the output will use pulse width modulation, where the pulse width increase or decreases over time. The total pulse width period is one second.

  For analog outputs, you can select if the output should also pulse with a one second pulse width modulation, or simply ramp the voltage up and down with voltage modulation.

  The output's value, on a scale of 0-100%, is calculated as follows:



  The output is at 0% when the demand is below the setpoint, and increases proportionally with the demand until it finally reaches 100% when the demand reaches the (setpoint + proportional band). The sum of the setpoint and the demand cannot be greater than 100%. Here is an example:

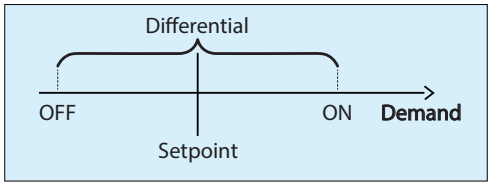
  Given the
  - ▹ Setpoint = 25%
  - ▹ Proportional band = 50%
  - ▹ Demand = 45%

  Then the calculated output value is:
  ((45-25)) / 50 = 40%

  This output percentage is then converted into a pulse width for pulsing outputs, or into a voltage for voltage modulating analog outputs.

  For example, a 25% output percentage for a pulsing output will result in the output being ON for 0.25 seconds, and then OFF for the remaining 0.75 seconds. These pulses will simply repeat over and over. For modulating 0-10VDC outputs, a 25% output will provide 2.5VDC at the output terminals.

- **Differential**: In Differential (ON/OFF) mode, the output only has 2 states, ON or OFF. From the OFF state, the output turns ON when the demand passes (setpoint + differential/2) and remains ON until the demand goes back down below (setpoint – differential/2) (see figure below). The setpoint must always be greater than the differential. The sum of the setpoint and the differential must be less than 100%.



5.3.3 - Output Default Values

OUTPUT	SOURCE	SETPOINT	CONTROL MODE
Digital Output	Demand	Heating: 50%	Differential: 40%
Analog Output	Demand	Heating: 25%	Proportional Band: 75% (Pulsed)

Figure 17 - Output Default Values

5.3.4 - Output Options

- **Reverse Acting**: The voltage that appears at the terminals of the output will be inverted compared to the value calculated above. For pulsing outputs, where the calculated output percentage is 25%, it means that the output will be OFF for 0.25 seconds and ON for 0.75 seconds. For analog outputs, where the calculated output percentage is 25%, it means that the voltage at the terminals of a 0-10VDC output will be 7.5 VDC.
- **Pulsed**: This option is only available for the Analog Output, and determines if it will use a one-second pulse width modulation instead of normal voltage modulation.
- **Range**: This option is only available for the Analog Output. It specifies the voltage range to be used:
  - 0-10V
  - 2-10V
  - 0-5V
- **Special Function**: These are special settings you can attribute to this output.
- **Radiant Floor**: Indicates that this output controls a radiant floor system. The control mode must be set to proportional. The calculated output percentage will not be directly appliedto the output's terminals in the mode, but instead be used to help select the target radiant floor temperature setpoint. ***See the Radiant Floor Configuration screen for more details.***

5.3.5 - Discharge Air Control

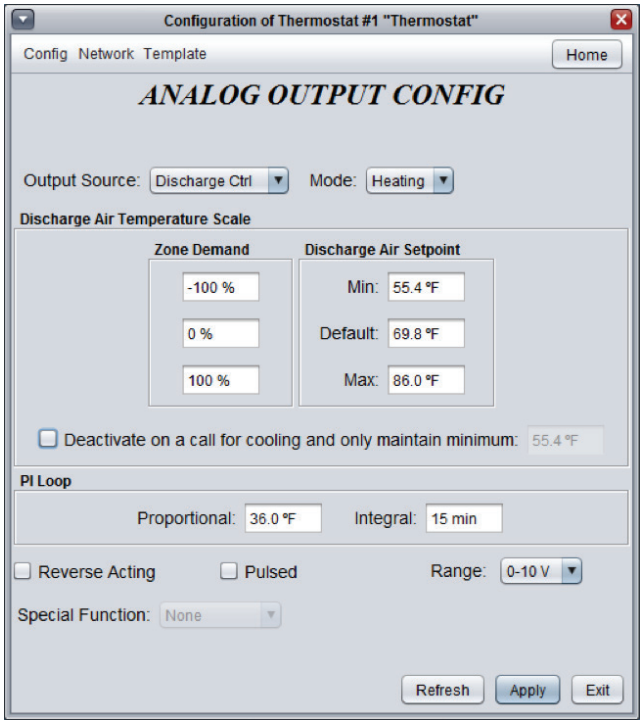
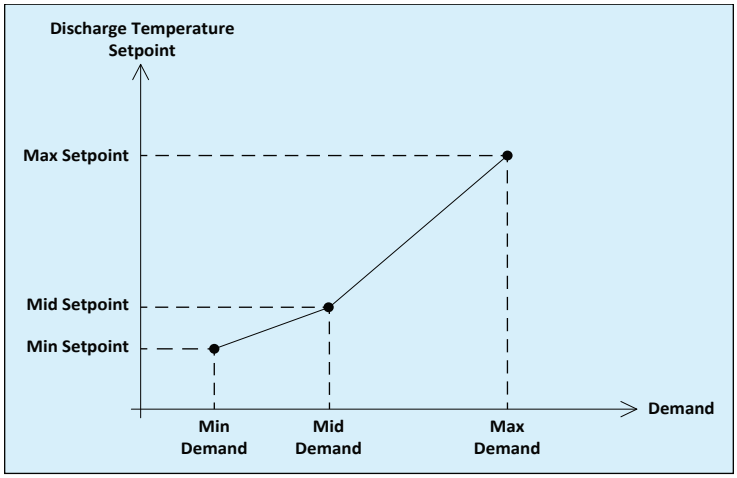


Figure 18 - Analog Output Configuration Screen

The zone demand determines the discharge air setpoint based on a reset scale. The output can operate in heating or cooling mode. This sequence is best used for applications such as a preheat coil. Reminder for zone demand: -100% is a full cooling call, 100% is a full heating call, and 0% the zone is satisfied.



<u>Deactivate on a call for cooling and only maintain minimum</u>
When this checkbox is selected, the output will cease maintaining the reset scale setpoint upon a cooling demand and remain off. It will only modulate to maintain a configurable minimum discharge air temperature (low limit protection).
Note: this checkbox is not applicable if the Mode is set to Cooling.

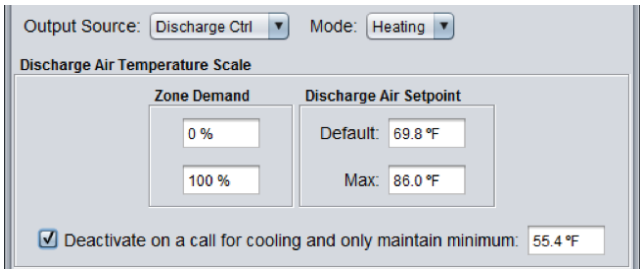


Figure 19 - Discharge Air Control with Low Limit

5.4 - Radiant Floor Configuration

This section is used to configure to the radiant floor control sequence. It can only be accessed when an output has been set to the 'Radiant Floor' special function *(see Output Configuration screen, p.18)*.

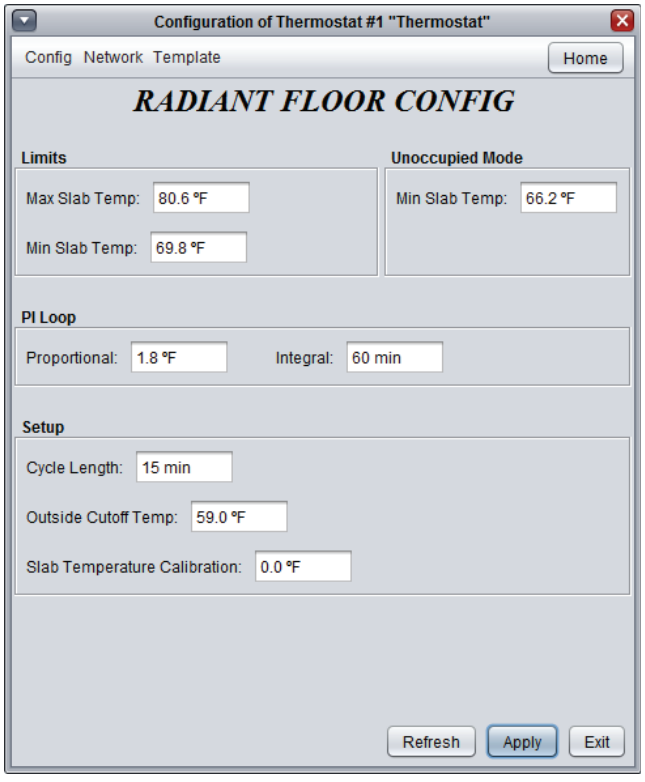


Figure 20 - Radiant Floor Configuration Screen

5.4.1 - Limits

The slab target temperature is determined using a scale based on the minimum and maximum slab setpoints limits. The calculated percentage of the output assigned to the Radiant Floor is then used to select the target based on this scale:

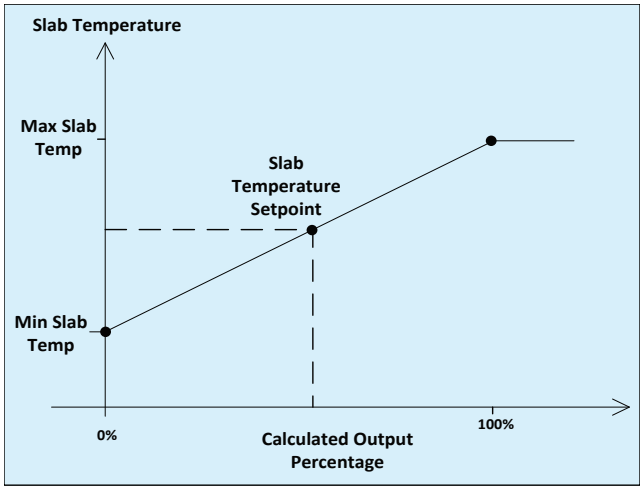


Figure 21 - Slab Temperature Target Scale

(See p.19 for more information on how the output percentage is calculated in proportional mode).

EXAMPLE

An output is set as a radiant floor output. Its heating setpoint is 30%, with a proportional band of 60%. The minimum slab temperature is set to 69.8°F, and the maximum slab temperature is set to 80.6°F.

At a given moment, the demand of the zone is 45%. The *Calculated Output Percentage* is therefore (45-30) / 60 = 25%.

Therefore, the *Slab Temperature Setpoint* will be 25% of the way between the min and max slab limits:
(80.6-69.8) x 0.25 + 69.8 = 72.5°F.

- **Max Slab Temp**

Default	80.6 °F / 27 °C

- **Min Slab Temp**

Default	69.8 °F / 21 °C

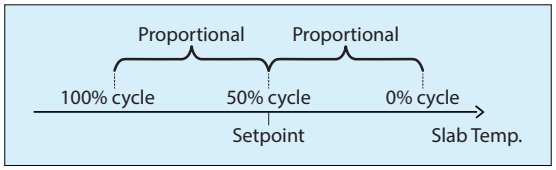
5.4.2 - Unoccupied Mode

- **Min Slab Temp**: In unoccupied mode, the minimum slab scale limit above is instead replaced by this value. Operation is otherwiseidentical.

Default	66.2 °F / 19 °C

5.4.3 - PI Loop

The controller heats the radiant floor using pulse width modulation. The percentage of the cycle that the output is activated is determined by a proportional / integral (PI) loop.



The output pulses at 50% of the cycle length (defined below) when the slab temperature reaches the setpoint. The proportional band will increase or reduce the length of the pulse depending on the offset from the setpoint. The integral increases the action of the output over time (the longer the slab temperature is incorrect, the more effect the integral component will have).

- **Proportional**:

Default	1.8 °F / 1 °C

- **Integral**: Defined as the amount of time required to cause the pulse width to vary by 100% to compensate for a continual error of 1.8 °F (1 °C).

Default	60 mins

5.4.4 - Setup

- **Cycle Length**: The amount of time for a complete ON and OFF cycle.

Default	15 mins

- **Slab Temperature Calibration**: This applies an offset to the slab temperature reading, if required.

Default	0 °F / 0 °C

- **Outside Cutoff Temp**: Above this temperature, the radiant floor output always remains deactivated. (There is a 3.6 °F / 2°C differential to allow for temperature fluctuations).

Default	59 °F / 15 °C

5.5 - Temperature Calibration

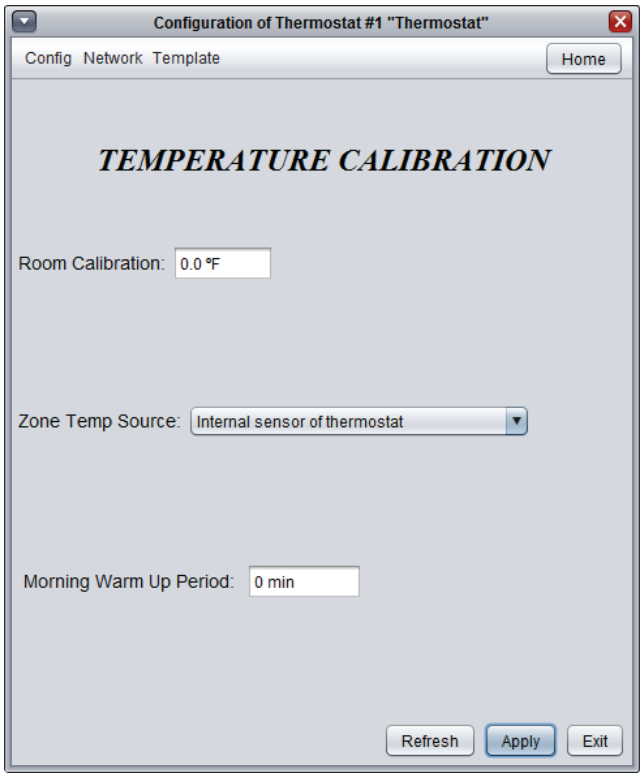


Figure 22 - Temperature Calibration Screen

- **Room Calibration**: This value will be added to the temperature received from the room sensor to calculate the active zone temperature.

Default	0 °F / 0 °C

- **Zone Temp Source**: This option lets you decide whether to use an external temperature sensor as the main temperature source, to simply use the internal sensor, or to use an average of the two. This option will be disabled if an output is set to control a radiant floor, as the auxiliary input is automatically used as an input for the slab temperature.

- **Morning Warm Up Period**: The duration that the digital or analog output will be disabled after receiving a morning warm up command from the network master, unless the network master is using a longer period.

Default	0 min

5.6 - Device Properties

Figure 23 - Device Properties Screen

This screen shows all the intrinsic properties of the device you are configuring. This helps you determine its capabilities without having to visually inspect the device.

- **Device Type**: The type of controller you are configuring.
- **Software Version**: The current software in the controller. The greater the software version, the more advanced the device is. Devices can be upgraded by reprogramming them (see "Reprogram").
- **Hardware Version**: This is the physical nature of the controller. Different hardware has different features. The hardware can only be changed by replacing it physically.
- **Device Number**: The network address of the controller. By default, the Prolon T1100 Thermostat is set to address 101. You can change the address though Focus by setting a new number, or manually changing it at the thermostat itself.
- **Device Name**: This field indicates the current name of the controller, which you can modify. Alternatively, you can just right-click on the icon and select the rename option.
- **Language**: Choose the preferred language to be used.
- **Temp Unit**: Choose the preferred temperature unit (Fahrenheit or Celsius) to be displayed on the T1100 LCD screen and internal menus. This does not affect how temperature is displayed in the Focus software.
- **Reset Device**: Causes the device to perform a reset. All configuration properties REMAIN SAVED. However, resetting the controller removes all active overrides.
- **Reprogram**: This function is used to upgrade the controller to a new software version. Focus will begin by asking you for the PRLFW file that contains the software update. Software update PRLFW files can only be provided by Prolon. At the end of the procedure, Focus will automatically reapply all the parameters you have previously configured into the device.

  Should there be any interruption during the programming procedure (due to intermittent communication or other), the procedure is halted to allow time for the problem to be fixed. When ready, the whole upgrade procedure can be resumed at any time by pressing this button again. It is normal for the icon to turn grey and become unresponsive during this period. Simply continue with the procedure.

5.7 - Group Codes

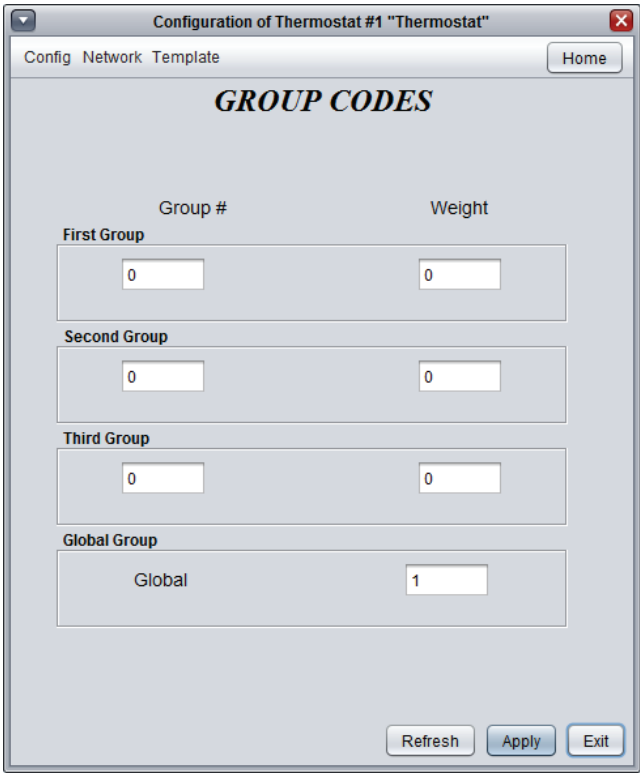


Figure 24 - Group Codes Screen

This screen lets you configure which math groups the ***T1100 Digital Thermostat*** should belong to, as well as the voting weight it should have in each group. This information is used by the network master as part of Prolon's Flexi-Zone math calculation system. A ***T1100 Digital Thermostat*** can belong to three different groups at a time, as well as the global group.

- **Group #**: A group to which the ***T1100 Digital Thermostat*** has been assigned. When this is set to zero, the ***T1100 Digital Thermostat*** does not participate in a group.

Default	0

- **Weight**: The weight of the T***1100 Digital Thermostat*** in the selected group, which is used in weighted average calculations. Setting this to zero removes it from the group.

Default	0

- **Global Weight**: The weight of the ***T1100 Digital Thermostat*** in the global group, which is used in weighted average calculations. Setting this to zero removes it from the global group.

Default	1

5.8 - COM Port Settings

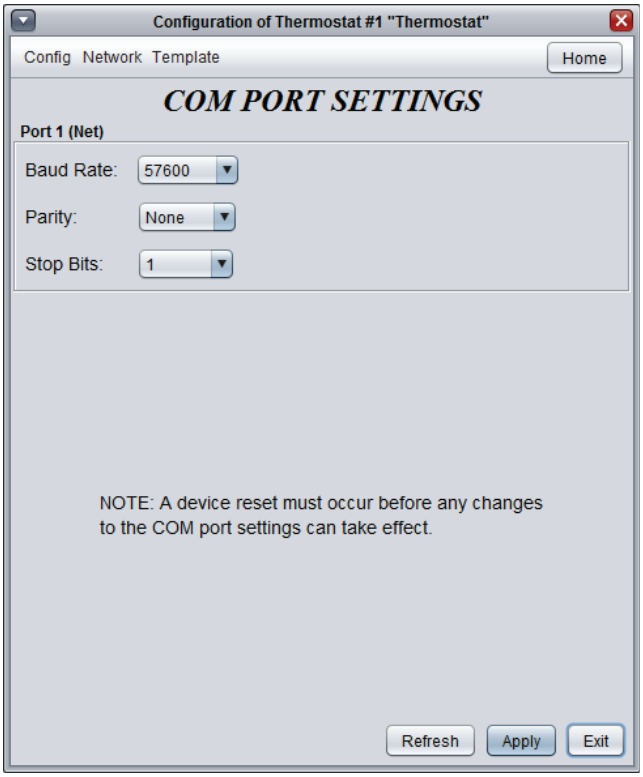


Figure 25 - COM Port Configuration Screen

Changes to the settings in this section will only take effect once the ***T1100 Digital Thermostat*** is reset or has power cycled.

- **Baud Rate**: This sets the baud rate value for the COM port. The default baud rate used by a ***T1100 Digital Thermostat*** is 57600bps but may be set to any of these standard values:
  - 9600 bps
  - 19200 bps
  - 38400 bps
  - 57600 bps
  - 76800 bps
  - 115200 bps

- **Parity**: This sets the parity for communication on the COM port. The default parity used by a ***T1100 Digital Thermostat*** is "None" but may be set to any of these standard values:
  - None
  - Odd
  - Even

- **Stop Bits**: Sets the number of stop bits used by the COM port. By default, it is set to 1, but can also be set to 2.

5.9 - Template Menu

5.9.1 - Save as Template

The template function gives you the ability to save the configuration of a particular ***T1100 Digital Thermostat*** for future use, which can then be applied to any other ***T1100 Digital Thermostat***, regardless of hardware platform. Each configurable property of the ***T1100 Digital Thermostat*** is saved into this template file, except for its name. This function is very useful if you have many ***T1100 Digital Thermostats*** with the same or very similar configurations. You will be able to quickly copy and paste the configuration from ***T1100 Digital Thermostat*** to ***T1100 Digital Thermostat***.

5.9.2 - Load Template...

The Load Template function allows you to apply a previously saved configuration to this controller. Templates may be sourced from local VCT files on your computer or from any ***T1100 Digital Thermostat*** in any project stored in your cloud account. Clicking "Apply" will immediately write all configuration properties found in the template to the controller, after which values may be modified in the normal manner.

Note: Controller names and addresses will not be changed as part of the template application process.

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