



Driver Suite

Crestron SIMPL Integration Guide

INCLUDED MODULES

CoolAutomation Manager v1

CoolAutomation Zone v1

CoolAutomation Sensor v1

CoolAutomation HOA Zone v1

CoolPlug Helper v1

COMPATIBLE DEVICES

CoolMaster · CoolMasterNet* · CoolLinkHub · CoolLinkBridge · CoolMaster Edge
GS-SMT-HOA · GS-SMT-IO · SMT-131 · CoolPlug

Revision 1.0.5 · 2026-10-04 13:22 EDT

TCP/IP and RS-232 transport supported

Overview

Five release modules. Use one Manager per CoolAutomation device, one Zone per HVAC indoor unit, one Sensor per SMT-IO point, one HOA Zone per SMT-HOA hydronic zone, and the optional CoolPlug Helper only when commissioning CoolPlug settings. The Manager owns PRM queueing, parsing, polling, and child-module buses; the external TCP/IP Client or RS-232 symbol owns the wire.

Supports TCP/IP and RS-232 transport. Wire any Crestron TCP/IP Client or COM symbol to the Manager transport pins. Zone, Sensor, and HOA Zone modules filter their own UID from Manager broadcasts.

Release 1.0.5 is an official production patch. It fixes Mode+ON ordering by batching ON, selected mode, and targeted refresh, and prevents stale STATE replies from bouncing a newly commanded Zone or HOA Zone setpoint. It uses LF-framed child buses, single-owner bounded buffered parsers, and one persistent Manager poller. Upgrade all five production modules together; older mixed sets are unsupported. For product and driver support, open a CoolAutomation support request at <https://support.coolautomation.com/hc/en-us/requests/new>.

Validation and Operating Notes

The local RMC4 capture covered 14 hours 39 minutes, 5,749 transmitted commands with zero recorded exit codes, and no recorded disconnects. Captured processor error, warning, fatal, handle-warning, SIMPL+ exception, and restart counters stayed at zero. Queue depth peaked at 8 and drained in about one minute.

Hourly aggressive command windows postponed background per-line polls by as much as 11 minutes 24 seconds while command responses continued. Normal use is occasional user setpoint or mode changes. Sustained command flooding can delay background feedback.

This RMC4 run is shorter than the previously reported 40-95 hour CP4 failure window. Long-duration CP4 confirmation remains open; short parser scheduling waits are retained. The release preserves the tested runtime implementation.

Compatible Devices

CoolMaster · CoolMasterNet* · CoolLinkHub · CoolLinkBridge · CoolMaster Edge

PRM ASCII protocol · TCP port 10102 · RS-232 default 9600 8N1 · up to 16 simultaneous TCP connections

* CoolMasterNet is discontinued; CoolMaster is the current model. Both are supported – protocol is backwards compatible.

NOTE

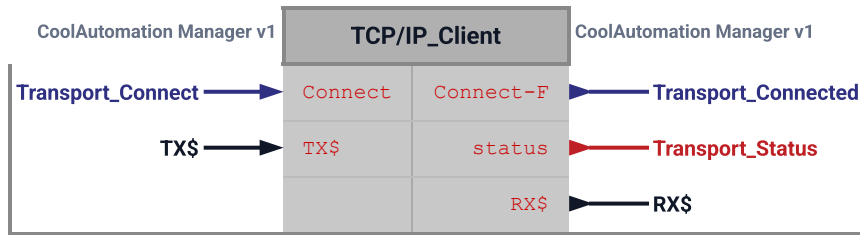
CoolMaster Edge first-time setup: run `set aserver enable 1` once from a terminal/service session before using TCP port 10102. The Manager cannot send this automatically because TCP is unavailable until the ASCII server is enabled.

Quick Start

1. Add Modules

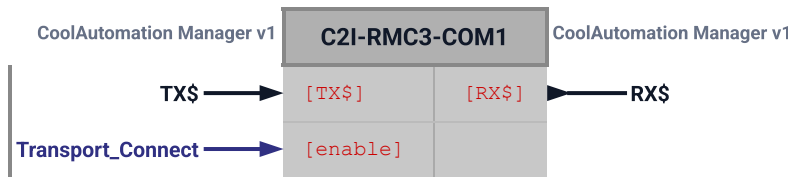
- Add **CoolAutomation Manager v1** -- one instance per gateway
- Add **CoolAutomation Zone v1** -- one instance per indoor unit
- Add **CoolAutomation Sensor v1** -- one instance per SMT-IO sensor point (optional)

2. Wire Transport (TCP/IP)



Set **Transport_Mode** parameter = 0 (TCP/IP mode). Set the TCP/IP Client IP address to the device IP and port 10102.

2. Wire Transport (RS-232)



Set **Transport_Mode** parameter = 1 (RS-232 mode). Configure COM port to 9600 8N1 (default).

3. Wire the Bus

- Manager **To_Zone_Modules_Tx\$** → every Zone **From_Manager\$**
- Every Zone **To_Manager\$** → Manager **From_Zone_Modules\$**
- Manager **To_Sens_Tx\$** → every Sensor **From_Manager\$**

4. Set IDs and Parameters

- Each Zone: drive **Unit_UID\$** with the PRM address (e.g., **L1.001**)
- Each HOA Zone: drive **Unit_UID\$** with the HOA PRM address (e.g., **L2.011**)
- Each Sensor: drive **Sensor_UID\$** with the PRM sensor address (e.g., **L3.001.001**)
- Manager: set **Poll_Interval_Sec** (default 45) and **Sens_Poll_Interval_Sec** (default 45)

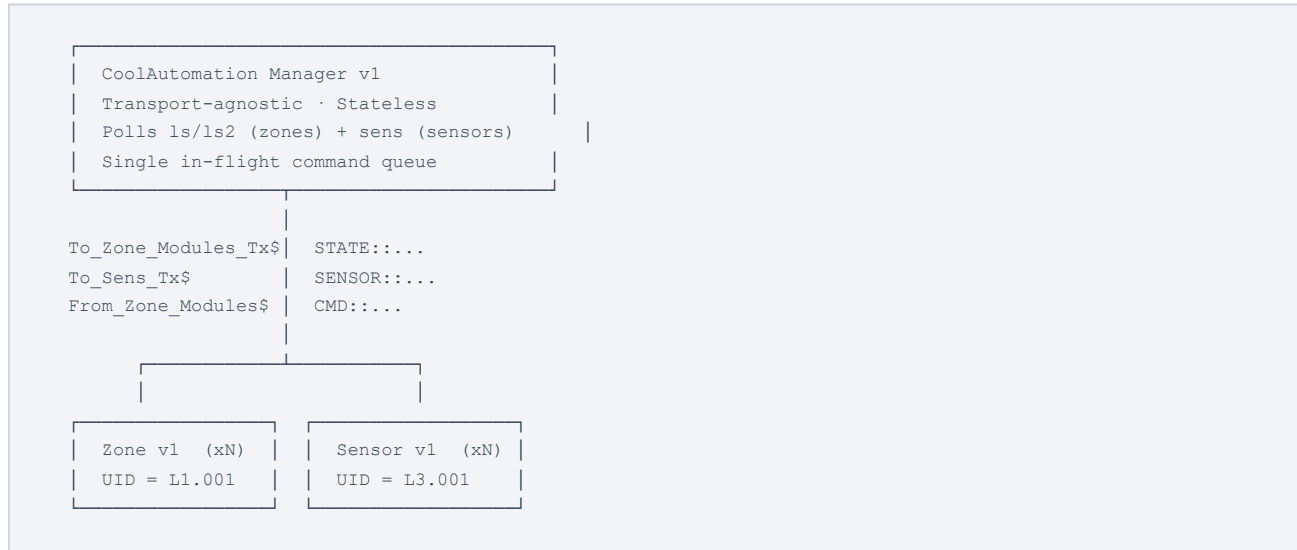
NOTE

The 1.0.5 source release includes five module pairs and help. The older compiled demo is excluded. Follow the wiring steps above for program integration.

Architecture

Release Module Design

Manager broadcasts; Zone, Sensor, and HOA Zone modules subscribe. The Manager polls the device and forwards every state line onto the bus. Each child module filters by its own UID - no per-zone arrays, no shared unit state in the Manager. Modules are delivered as SIMPL+ user modules.



Bus Message Format

Manager-to-child records use LF (0x0A) framing and retained BUFFER_INPUTs. Child commands use the existing serial request interface.

Message	Direction	Description
STATE:<UID>:<onoff>:<setT>:<roomT>:<fan>:<mode>:...	Manager → Zone	Zone state update from ls/ls2 poll. Temperatures as tenths-integer (830 = 83.0°F).
MANAGER:READY	Manager → helpers	Broadcast after startup set/line/ifconfig completes. CoolPlug Helper uses this to schedule delayed automatic readback.
CMD:<UID>:<verb>[:<arg>]	Zone → Manager	PRM request. modeon holds ON, mode and refresh in one ordered queue batch.
SENSOR:<UID>:<type>:<value>	Manager → Sensor	Sensor reading from sens poll.
ZONEOK:<UID>:<verb>	Manager → Zone	Command completed successfully for this UID.
ZONEERR:<UID>:<verb>:<code>:<text>	Manager → Zone	Command failed for this UID; code is PRM exit code.
PASSTHRU:<raw>	Zone → Manager	Raw PRM command sent through the Manager command queue.

NOTE Temperature values use tenths-integers: 830 = 83.0°F; 215 = 21.5°C.

CoolAutomation Manager v1

One instance per physical CoolAutomation device. Handles PRM handshake, command queueing, zone and sensor polling, and child-module bus broadcasts. The external TCP/IP Client or RS-232 symbol owns the physical transport; the Manager owns the protocol.

Parameters

Parameter	Type	Description
Poll_Interval_Sec	Time	HVAC poll interval in seconds. Default 45s; valid range 5s..3600s. In Fahrenheit mode Manager polls with Is for rounded CoolPlug/CoolLinkHub setpoints; in Celsius mode it polls with Is2 for tenths precision.
Sens_Poll_Interval_Sec	Time	Sensor poll interval in seconds. Default 45s; valid range 5s..3600s.
Transport_Mode	Decimal list	0 = external TCP/IP Client. 1 = RS-232 direct serial transport. SIMPL parameter properties expose these choices as a list where supported.
Inter_Command_Gap_Sec	Time	Queue pacing between PRM commands. Values are seconds only, default to 2s, and clamp to 1s..10s. Lower values should be hardware-tested.

Digital Inputs

Signal Name	Type	Description
Connection Control		
Transport_Connected	DI	Assert when external TCP/IP Client reports connected. Manager begins init sequence on rising edge.
Connect	DI	Maintained high requests/maintains the transport session and protocol initialization. Low drops the request and disables reconnect/polling.
Polling & Refresh		
Poll_Enable	DI	High: enable HVAC polling at configured intervals. Low: suspend HVAC polling.
Refresh_Names	DI	Pulse to re-send props query and refresh unit name outputs on all zones.
Sens_Enable	DI	High: include sensor polling. ERROR:700 marks sensors unavailable/disabled and retries slowly while high.
Reboot_Device	DI	Pulse to send PRM reboot command. Device disconnects; Manager auto-reconnects.
Temperature Scale		
Set_Scale_F	DI	Pulse to configure device for Fahrenheit reporting. Stored in device NVRAM.
Set_Scale_C	DI	Pulse to configure device for Celsius reporting. Stored in device NVRAM.
Swing_Enable	DI	Required gate for Zone louver/swing commands. Hold high only on systems where louver control is desired/supported.
Diagnostics		
Debug	DI	High: enable console Trace messages plus Debug_TX\$ and Debug_RX\$ outputs. Increases string bus traffic significantly.

Analog Inputs

Signal Name	Type	Description
Transport		
Transport_Status	AI	TCP/IP Client status analog. Status 2 means connected. Ignored in RS-232 mode.
Verbose_Errors	AI	0 = suppress repeated identical errors. 1 = always output error text.

String Inputs

Signal Name	Type	Description
Bus Inputs		
From_Zone_Modules\$	SI	CMD and PASSTHRU messages from all Zone module instances.
RX\$	SI	Raw TCP receive data from external transport symbol (BUFFER_INPUT, 24 576 bytes).
User_CMD\$	SI	Raw PRM ASCII command -- enqueued directly. For diagnostics and commissioning.

Digital Outputs

Signal Name	Type	Description
Connection & Status		
Transport_Connect	DO	Drive high to maintain TCP connection (wire to TCP/IP Client Connect input).
Online_FB	DO	High when transport is connected and the PRM session is active.
Device_Info_Valid_FB	DO	High after ifconfig response fully received and device strings populated.
Polling_FB	DO	High while an HVAC poll cycle is active.
Temp_Scale_Is_F_FB	DO	High when device is configured for Fahrenheit (from set response).
Sensor State		
Sens_Available_FB	DO	High when at least one sensor reading has been received.
Sens_Disabled_FB	DO	High when sens polling was auto-disabled after ERROR:700 (no sensors on device).

Analog Outputs

Signal Name	Type	Description
Diagnostics & Counts		
Last_Exit_Code	AO	Most recent PRM exit code (0 = OK; non-zero = error).
Queue_Depth_FB	AO	Number of commands currently waiting in the send queue.
Zone_Count_FB	AO	Count of zone UIDs seen in the last completed HVAC poll cycle.
Sensor_Count_FB	AO	Count of sensor readings received in the last sens poll.

String Outputs

Signal Name	Type	Description
Device Information		
Build_Info\$	SO	Module build timestamp string (e.g., "Build: 2026-05-12 10:30").
Device_SN\$	SO	Device serial number from set response.
Device_IP\$	SO	Device IP address from ifconfig response.
MAC_Address\$	SO	Device MAC address from ifconfig response.
Firmware_Version\$	SO	Firmware version string from set response.
Active_Lines\$	SO	Comma-separated list of active bus lines (from line command).
Diagnostics		
Last_Error\$	SO	Most recent error text string.
Debug_TX\$	SO	Raw bytes sent to device (only when Debug is high).
Debug_RX\$	SO	Raw bytes received from device (only when Debug is high).
Bus Outputs		
To_Zone_Modules_Tx\$	SO	STATE:, ZONEOK, ZONEERR, MANAGER:READY, and helper/config messages broadcast to child modules.
To_Sens_Tx\$	SO	SENSOR: messages broadcast to all Sensor instances.
TX\$	SO	Raw PRM ASCII to send (wire to TCP/IP Client Send\$ input).

CoolAutomation Zone v1

One instance per indoor unit. Drive the `unit_uid$` string input with the PRM address (e.g., `L1.001`) and wire it to the Manager bus. The module handles all state tracking and command translation – no other configuration required.

Parameters

Parameter	Type	Description
<code>Temp_Step_Tenths</code>	Integer	Setpoint step size as tenths-integer. Default 10 (= 1.0°). Use 5 for 0.5° steps.

Digital Inputs

Signal Name	Type	Description
Power		
<code>Power_On</code>	DI	Pulse to turn unit on.
<code>Power_Off</code>	DI	Pulse to turn unit off.
Mode Selection		
<code>Mode_Cool</code>	DI	Pulse to set operating mode to Cool.
<code>Mode_Heat</code>	DI	Pulse to set operating mode to Heat.
<code>Mode_Fan</code>	DI	Pulse to set operating mode to Fan only.
<code>Mode_Dry</code>	DI	Pulse to set operating mode to Dry (dehumidify).
<code>Mode_Auto</code>	DI	Pulse to set operating mode to Auto.
<code>Send_ON_With_Mode</code>	DI	Maintained option. When high, a mode button/analog command sends one atomic request; Manager queues ON, selected mode, and one targeted refresh. Default low keeps mode-only behavior.
Fan Speed		
<code>Fan_Very_Low</code>	DI	Pulse to set fan speed to Very Low (if supported by unit).
<code>Fan_Low</code>	DI	Pulse to set fan speed to Low.
<code>Fan_Medium</code>	DI	Pulse to set fan speed to Medium.
<code>Fan_High</code>	DI	Pulse to set fan speed to High.
<code>Fan_Top</code>	DI	Pulse to set fan speed to Top.
<code>Fan_Auto</code>	DI	Pulse to set fan speed to Auto.
Louver		
<code>Louver_Auto</code>	DI	Set louver to Auto position.
<code>Louver_Horizontal</code>	DI	Set louver to Horizontal (fully open).
<code>Louver_Vertical</code>	DI	Set louver to Vertical (fully closed / downward).
<code>Louver_30_Deg</code>	DI	Set louver to 30° position.
<code>Louver_45_Deg</code>	DI	Set louver to 45° position.

Signal Name	Type	Description
Louver_60_Deg	DI	Set louver to 60° position.
Louver_Stop	DI	Stop louver at current position.
Temperature & Maintenance		
Set_Temperature_Up	DI	Increment setpoint by Temp_Step_Tenths.
Set_Temperature_Dn	DI	Decrement setpoint by Temp_Step_Tenths.
Reset_Filter_Sign	DI	Clear the filter maintenance reminder on this unit.

Analog Inputs

Signal Name	Type	Description
Direct-Set Controls		
Mode	AI	Set operating mode: 1=Cool, 2=Heat, 3=Fan, 4=Dry, 5=Auto.
Fan_Speed	AI	Set fan speed: 1=VLow, 2=Low, 3=Med, 4=High, 5=Top, 6=Auto.
Set_Temperature	AI	Set temperature setpoint as tenths-integer (e.g., 720 = 72.0°F).
Feed_Temperature	AI	External temperature override (from a room sensor) as tenths-integer.
Louver	AI	Set louver position: 0=None, 1=Auto, 2=Horizontal, 3=Vertical, 4=30°, 5=45°, 6=60°, 7=Stop.

String Inputs

Signal Name	Type	Description
Bus		
Unit_UID\$	SI	PRM unit identifier, e.g., L1.001. Must match exactly.
From_Manager\$	SI	Retained LF-framed STATE:, ZONEOK, and ZONEERR messages from Manager To_Zone_Modules_Tx\$.

Digital Outputs

Signal Name	Type	Description
Power & Mode		
Power_On_Fb	DO	High when unit is on.
Power_Off_Fb	DO	High when unit is off.
Mode_Cool_Fb	DO	High when mode is Cool.
Mode_Heat_Fb	DO	High when mode is Heat.
Mode_Fan_Fb	DO	High when mode is Fan.
Mode_Dry_Fb	DO	High when mode is Dry.
Mode_Auto_Fb	DO	High when mode is Auto.
Fan Speed		
Fan_Very_Low_Fb	DO	High when fan speed is Very Low.

Signal Name	Type	Description
Fan_Low_Fb	DO	High when fan speed is Low.
Fan_Medium_Fb	DO	High when fan speed is Medium.
Fan_High_Fb	DO	High when fan speed is High.
Fan_Top_Fb	DO	High when fan speed is Top.
Fan_Auto_Fb	DO	High when fan speed is Auto.
Louver		
Louver_Auto_Fb	DO	High when louver is at Auto position.
Louver_Horizontal_Fb	DO	High when louver is at Horizontal.
Louver_Vertical_Fb	DO	High when louver is at Vertical.
Louver_30_Deg_Fb	DO	High when louver is at 30°.
Louver_45_Deg_Fb	DO	High when louver is at 45°.
Louver_60_Deg_Fb	DO	High when louver is at 60°.
Louver_Stop_Fb	DO	High when louver is stopped.
Status & Alerts		
Filter_Sign_Fb	DO	High when unit is signaling a filter maintenance reminder.
In_Error_Fb	DO	High when unit is in a fault or lockout state (PRM fail field non-OK).
In_Demand_Fb	DO	High when unit is actively heating or cooling.
Command_Error_Fb	DO	High when the most recent command returned an error.
Feed_Error_Fb	DO	High when the Manager returned a feed/zone-scoped error.

Analog Outputs

Signal Name	Type	Description
State Values		
Mode_Fb	AO	Current operating mode: 1=Cool, 2=Heat, 3=Fan, 4=Dry, 5=Auto.
Fan_Speed_Fb	AO	Current fan speed: 1=VLow, 2=Low, 3=Med, 4=High, 5=Top, 6=Auto.
Louver_Fb	AO	Current louver position: 0=None, 1=Auto, 2=Horizontal, 3=Vertical, 4=30°, 5=45°, 6=60°, 7=Stop.
Set_Temperature_Fb	AO	Current temperature setpoint as tenths-integer. The newest commanded value is held while stale replies are ignored; matching STATE confirms it. Command error or a 30-second timeout restores the latest raw value; temperature acknowledgements renew the window.
Room_Temperature_Fb	AO	Current room temperature as tenths-integer.
Command_Error_Code	AO	PRM exit code of the most recent failed command (0 = no error).
Feed_Error_Code	AO	Feed/zone-scoped error code from Manager.

String Outputs

Signal Name	Type	Description
Status & Diagnostics		
Status_Fb\$	SO	Status string from Manager state. OK when healthy; CP01-CP05 CoolPlug faults are expanded into readable text.
Unit_Name_Fb\$	SO	Unit name from props query (triggered by Refresh_Names on Manager).
Command_Error_Text\$	SO	Text description of the most recent command error.
Feed_Error_Text\$	SO	Text description of the most recent feed/zone error.
To_Manager\$	SO	CMD: messages sent to Manager From_Zone_Modules\$.

CoolAutomation Sensor v1

One instance per SMT-IO sensor point. Set **sensor_uid** to the PRM sensor address (e.g., **L3.001.001**) and wire to Manager **To_Sens_Tx\$**. Supports temperature, analog I/O, and digital I/O sensor types.

NOTE

Sensor polling is auto-disabled if the device returns ERROR:700 (no sensors attached). The Sens_Disabled_FB signal on the Manager will go high. Re-enabling requires pulsing Sens_Enable on the Manager after physical sensors are connected.

Sensor Types

Code	Type	Category	Feedback
1	T	Temperature sensor	Reports temperature as tenths-integer via Temperature_Fb.
2	AIN	Analog input 0-10V	Reports voltage via Analog_Voltage_Fb.
3	IN	Digital input	Contact closure -- Input_Open_Fb / Input_Closed_Fb.
4	OUT	Digital output	Relay -- Output_On_Fb / Output_Off_Fb.
5	AOUT	Analog output 0-10V	Reports current level via Output_Level_Fb. Writeable via Debug_Send_Level.

Digital Inputs

Signal Name	Type	Description
Debug Output Control		
Debug_Output_On	DI	Pulse to enable sensor debug writeback to device.
Debug_Output_Off	DI	Pulse to disable sensor debug writeback.
Debug_Send_Level	DI	Pulse to write the Debug_Output_Level value to the device output.

Analog Inputs

Signal Name	Type	Description
Configuration		
Sensor_Type	AI	Type filter: 1=T, 2=AIN, 3=IN, 4=OUT, 5=AOUT. Module ignores SENSOR: messages not matching this type.
Debug_Output_Level	AI	Output level to write on Debug_Send_Level pulse (analog output types only).

String Inputs

Signal Name	Type	Description
Bus		
Sensor_UID\$	SI	Sensor identifier matching PRM sens output, e.g., L3.001.001.
From_Manager\$	SI	Retained LF-framed SENSOR: messages from Manager To_Sens_Tx\$.

Digital Outputs

Signal Name	Type	Description
Presence & Type		
Seen_Fb	DO	High after the first SENSOR: message matching this UID has been received.
Type_T_Fb	DO	High when sensor type is Temperature.
Type_Ain_Fb	DO	High when sensor type is Analog Input.
Type_In_Fb	DO	High when sensor type is Digital Input.
Type_Out_Fb	DO	High when sensor type is Digital Output.
Type_Aout_Fb	DO	High when sensor type is Analog Output.
Digital I/O State		
Input_Open_Fb	DO	High when digital input is open (type IN only).
Input_Closed_Fb	DO	High when digital input is closed (type IN only).
Output_On_Fb	DO	High when digital output is energized (type OUT only).
Output_Off_Fb	DO	High when digital output is de-energized (type OUT only).

Analog Outputs

Signal Name	Type	Description
Values		
Type_Fb	AO	Sensor type code: 1=T, 2=AIN, 3=IN, 4=OUT, 5=AOUT.
Temperature_Fb	AO	Temperature reading as tenths-integer (type T only).
Analog_Voltage_Fb	AO	Analog reading scaled (type AIN or AOUT).
Output_Level_Fb	AO	Current output level (type AOUT only).

String Outputs

Signal Name	Type	Description
Diagnostics		
Type_Text_Fb\$	SO	Sensor type as text: "T", "AIN", "IN", "OUT", or "AOUT".
Value_Raw_Fb\$	SO	Raw value string as received from device (for diagnostics).
To_Manager\$	SO	Reserved for future Sensor→Manager messaging.

CoolAutomation HOA Zone v1

One instance per underfloor heating zone on a CoolAutomation SMT-HOA board. The SMT-HOA is an 8-zone hydronic/underfloor heating controller that communicates via Modbus RTU over the CoolLinkBridge. HOA zones appear as standard PRM units on the bus (e.g., **L2.011**), so the same Manager module handles them alongside regular HVAC zones -- no separate gateway is required.

In addition to standard on/off and setpoint control (identical to Zone v1), the HOA Zone module writes thermostat configuration directly to the SMT-HOA board registers via routed HOACFG Modbus commands. Set all config inputs first, then hold **Write_Config** high for three seconds to commit the configuration. A short pulse does nothing; invalid values block writes.

NOTE

HOA zones have no fan speed, operating mode, or louver -- these fields are ignored in the PRM response. **In_Demand_Fb** reflects the relay output state (calling for heat). **In_Error_Fb** reflects the PRM status field.

UID Format

HOA zone UIDs use the standard PRM two-part format: **L2.011** = Line L2, Board 1, Zone 1. The three-digit suffix encodes both the Modbus slave ID (tens digit) and zone position within the board (units digit):

- L2.011** → Line L2, Board 1, Zone 1 (Modbus slave 1, register base 30)
- L2.015** → Line L2, Board 1, Zone 5 (Modbus slave 1, register base 70)
- L2.021** → Line L2, Board 2, Zone 1 (Modbus slave 2, register base 30)
- L2.028** → Line L2, Board 2, Zone 8 (Modbus slave 2, register base 100)

The module derives the Modbus slave ID and zone position automatically from the UID -- no separate parameter is needed. **Modbus_Slave_Fb** and **Zone_Position_Fb** confirm the decoded values after the UID is set.

Parameters

Parameter	Type	Description
Temp_Step_Tenths	Integer	Setpoint step for Up/Dn buttons, tenths-integer. Default 10 = 1.0°.

Digital Inputs

Signal Name	Type	Description
Power		
Power_On	DI	Pulse to turn zone on.
Power_Off	DI	Pulse to turn zone off.
Temperature		
Set_Temperature_Up	DI	Increment setpoint by Temp_Step_Tenths.
Set_Temperature_Dn	DI	Decrement setpoint by Temp_Step_Tenths.
Board Configuration		
Write_Config	DI	Hold high for three seconds to write validated config parameters via routed HOACFG register requests. A tap does nothing. Set all Config_* inputs first.

Signal Name	Type	Description
Set_Config_Scale_To_F	DI	Maintained level. High = Config_* write inputs are in ?F; Low = ?C (default). Module converts to ?C before Modbus write. Readback feedback is always in ?C because it comes from board registers.

Analog Inputs

Signal Name	Type	Description
Setpoint Control		
Set_Temperature	AI	Direct setpoint as tenths-integer. Same scale as the runtime device setting.
Temp_Step_Tenths	AI	Runtime override for setpoint step size. 0 uses the parameter default (10).
Board Configuration -- written after three-second Write_Config hold		
Config_Offset_Pos	AI	Positive sensor calibration offset -- tenths of selected scale (°C: 0-150 / °F: 0-270).
Config_Offset_Neg	AI	Negative sensor calibration offset magnitude -- tenths of selected scale. Net = Pos - Neg; drive one at a time.
Config_Diff	AI	Thermostat hysteresis (dead band) -- tenths of selected scale (°C: 5-500 / °F: 9-900). Default 5 = 0.5°C.
Config_Cutoff	AI	Floor sensor safety shutoff limit -- whole degrees (°C: 10-55 / °F: 50-131). Default 50°C / 122°F.
Config_Max_Cycles	AI	Max relay on/off cycles per hour (0-10). No scale conversion. Default 6.

String Inputs

Signal Name	Type	Description
Bus		
Unit_UID\$	SI	HOA zone UID, e.g., L2.011. Must match the CoolLinkBridge PRM address exactly.
From_Manager\$	SI	Retained LF-framed STATE:, ZONEOK, and ZONEERR messages from Manager To_Zone_Modules_Tx\$.

Digital Outputs

Signal Name	Type	Description
Power & Status		
Power_On_Fb	DO	High when zone is on.
Power_Off_Fb	DO	High when zone is off.
In_Demand_Fb	DO	High when the relay output is active (board is calling for heat).
In_Error_Fb	DO	High when PRM status field is non-OK (board fault or lockout).
Command_Error_Fb	DO	High when the most recent PRM command returned an error.
Config Write Status		
Config_Sent_Fb	DO	Latches high after the first successful Write_Config hold.
Config_Scale_Is_F_Fb	DO	High when Set_Config_Scale_To_F is asserted (config inputs interpreted as °F).

Signal Name	Type	Description
Config_Scale_Is_C_Fb	DO	High when config inputs are in °C (default). Inverse of Config_Scale_Is_F_Fb.

Analog Outputs

Signal Name	Type	Description
Runtime State		
Room_Temperature_Fb	AO	Current room temperature as tenths-integer (same scale as device).
Set_Temperature_Fb	AO	Current setpoint as tenths-integer. The newest commanded value is held while stale replies are ignored; matching STATE confirms it. Command error or a 30-second timeout restores the latest raw value; temperature acknowledgements renew the window.
Command_Error_Code	AO	PRM exit code of most recent failed command. 0 = no error.
Config Register Readback – always C units		
Config_Offset_Pos_Fb	AO	Actual board readback, positive offset magnitude in tenths °C.
Config_Offset_Neg_Fb	AO	Actual board readback, negative offset magnitude in tenths °C.
Config_Diff_Fb	AO	Actual board readback, thermostat hysteresis in tenths °C.
Config_Cutoff_Fb	AO	Actual board readback, cutoff limit in whole °C.
Config_Max_Cycles_Fb	AO	Actual board readback, max cycles per hour.
Commissioning		
Modbus_Slave_Fb	AO	Modbus slave ID decoded from UID tens digit. e.g., L2.023 → 2.
Zone_Position_Fb	AO	Zone position within board decoded from UID units digit. e.g., L2.023 → 3.

String Outputs

Signal Name	Type	Description
Status		
Status_Fb\$	SO	"OK" or "ERROR:" reflecting the PRM status field from the last STATE: message.
Command_Error_Text\$	SO	Text description of the most recent command error.
To_Manager\$	SO	CMD: and HOACFG register requests sent to Manager From_Zone_Modules\$.

Config Parameter Ranges

All config inputs follow the scale selected by **Set_Config_Scale_To_F**. The module converts F entries to C before writing Modbus registers. Readback values always report the board's C register values, even when the write values were entered in F. Values below show both the decimal meaning and the raw Crestron integer to drive:

Input	Type	Range	Description
Config_Offset_Pos	AI	0-150 (°C) / 0-270 (°F)	Positive sensor calibration offset in tenths of the selected scale. e.g. 50 = +5.0°C or +5.0°F depending on scale.
Config_Offset_Neg	AI	0-150 (°C) / 0-270 (°F)	Negative sensor calibration offset magnitude. Drive one of Pos/Neg at a time; net = Pos - Neg.
Config_Diff	AI	5-500 (°C) / 9-900 (°F)	Thermostat hysteresis (dead band) in tenths. Relay turns ON at setpoint - diff, OFF at setpoint. Default 5 = 0.5°C.
Config_Cutoff	AI	10-55 (°C) / 50-131 (°F)	Safety shutoff limit in whole degrees. Floor sensor shuts relay if this limit is exceeded. Default 50°C / 122°F.
Config_Max_Cycles	AI	0-10	Maximum relay on/off cycles per hour. Independent of temperature – a secondary valve-wear guard. Default 6.

Value	°C decimal	Crestron °C	°F decimal	Crestron °F
Config_Diff -- hysteresis	tenths of selected scale			
Min / default	0.5°C	5	~0.9°F	9
1 degree	1.0°C	10	1.8°F	18
2 degrees	2.0°C	20	3.6°F	36
5 degrees	5.0°C	50	9.0°F	90
Config_Offset -- calibration	tenths of selected scale			
+/-0.5°	0.5°C	5	~0.9°F	9
+/-1.0°	1.0°C	10	~1.8°F	18
+/-5.0°	5.0°C	50	~9.0°F	90
Maximum	15.0°C	150	~27.0°F	270
Config_Cutoff -- safety limit	whole degrees of selected scale			
Board minimum	10°C	10	50°F	50
Typical slab	40°C	40	104°F	104
Default	50°C	50	122°F	122
Board maximum	55°C	55	131°F	131
Config_Max_Cycles	count – same value in both scales			
No limit	0			
Default	6			
Maximum	10			

How Hysteresis Works

The SMT-HOA relay output is bang-bang (fully open or closed). `Config_Diff` defines the dead band around the setpoint:

- Relay turns **ON** when room temperature falls below *setpoint - differential*
- Relay turns **OFF** when room temperature rises back to *setpoint*

Example – setpoint 24.0°C, diff 0.5°C (value 5): valve opens at 23.5°C, closes at 24.0°C.

Underfloor floor slabs have large thermal mass and move slowly through temperature. The default 0.5°C hysteresis is appropriate. `Config_Max_Cycles` (default 6/hr) is a secondary hard limit on valve cycling regardless of temperature, protecting zone valves from wear. A wider differential of 1.0-2.0°C gives longer on/off cycles and slightly less precision, which suits slab systems well.

NOTE

Set and validate every configuration input before holding `Write_Config`. Invalid values block all writes and report local error 900. Config write inputs follow `Set_Config_Scale_To_F`; readback values always use board C units.

CoolPlug Helper v1

Optional commissioning helper for one CoolPlug on a CoolLinkHub or CoolLinkHub Wireless line. Normal HVAC control stays in the standard Zone module. The helper exists only to read and set temperature-source and master/slave settings without making the programmer type raw PRM commands.

NOTE

Write buttons are deliberately simple: hold **Write_Enable** high, then pulse the desired source or master/slave button. Releasing **Write_Enable** blocks all writes again. **Read_CoolPlug** does not require **Write_Enable**.

NOTE

After the Manager reports startup ready, the helper waits briefly and performs one automatic readback. This uses the same staggered sequence as the manual read: **plug <UID> set**, then **plug <UID> line** after the first command completes.

Parameters

Parameter	Type	Description
Default_Plug_UID\$	String	Default CoolPlug UID, e.g. L2.001 or L5.001. Plug_UID\$ can override this at runtime.

Digital Inputs

Signal Name	Type	Description
Readback		
Read_CoolPlug	DI	Pulse to send plug <UID> set , then plug <UID> line , then one plug <UID> wpan . Updates temperature-source, serial number, master/slave, online/offline, and wireless feedback.
Write Gate		
Write_Enable	DI	Maintained level. Must be high while any write pulse occurs.
Room Temperature Source		
Room_Source_Default	DI	Pulse while Write_Enable is high: set tsrc R D .
Room_Source_Indoor	DI	Pulse while Write_Enable is high: set tsrc R I .
Room_Source_Feed	DI	Pulse while Write_Enable is high: set tsrc R F .
Room_Source_External	DI	Pulse while Write_Enable is high: set tsrc R E .
Control Temperature Source		
Control_Source_Default	DI	Pulse while Write_Enable is high: set tsrc A D .
Control_Source_Indoor	DI	Pulse while Write_Enable is high: set tsrc A I .
Control_Source_Feed	DI	Pulse while Write_Enable is high: set tsrc A F .
Control_Source_External	DI	Pulse while Write_Enable is high: set tsrc A E .
Master/Slave		
Master_Mode_Auto	DI	Pulse while Write_Enable is high: automatic master/slave selection.

Signal Name	Type	Description
Master_Mode_Slave	DI	Pulse while Write_Enable is high: force slave.
Master_Mode_Master	DI	Pulse while Write_Enable is high: force master.
Reboot_Device	DI	Pulse while Write_Enable is high after Boot_Required_FB latches. Sends <code>plug <UID> boot 2</code> , e.g. <code>plug L5.001 boot 2</code> . This targets the selected CoolPlug, not the hub. The plug may not return positive confirmation; timeout is reported as sent/no confirmation and Status_Text\$ shows Reboot sent - no confirmation .

Digital Outputs

Signal Name	Type	Description
Command State		
UID_Valid_FB	DO	High when the selected UID is exact Lx.xxx format.
Write_Enable_FB	DO	Mirrors the write gate.
Command_Busy_FB	DO	High while waiting for Manager/device response.
Command_OK_FB	DO	Short pulse when command returns OK.
Command_Error_FB	DO	High when local validation or device command fails.
Validation_Blocked_FB	DO	Short pulse when a write is blocked by bad UID, missing Write_Enable, or invalid reboot state.
Settings_Valid_FB	DO	High after the helper has accepted or parsed at least one source/master setting.
Boot_Required_FB	DO	Latches high when a response line contains Boot Required.
Plug_Online_FB	DO	High after an OK response for the selected plug.
Plug_Offline_FB	DO	High after a device/Manager error for the selected plug.
Wireless_Status_Valid_FB	DO	High after a wireless readback line has been received and parsed.
Room Source Feedback		
Room_Source_Default_FB	DO	Current room source is Default.
Room_Source_Indoor_FB	DO	Current room source is Indoor return-air sensor.
Room_Source_Feed_FB	DO	Current room source is Feed temperature.
Room_Source_External_FB	DO	Current room source is External CoolPlug sensor.
Control Source Feedback		
Control_Source_Default_FB	DO	Current control source is Default.
Control_Source_Indoor_FB	DO	Current control source is Indoor return-air sensor.
Control_Source_Feed_FB	DO	Current control source is Feed temperature.
Control_Source_External_FB	DO	Current control source is External CoolPlug sensor.
Master/Slave Feedback		
Master_Mode_Auto_FB	DO	Current mode read/accepted as Auto.
Master_Mode_Slave_FB	DO	Current mode read/accepted as Slave.

Signal Name	Type	Description
Master_Mode_Master_FB	DO	Current mode read/accepted as Master.

Analog and String Outputs

Signal Name	Type	Description
Diagnostics		
Command_Status	AO	0 idle, 1 busy, 2 OK, 3 validation blocked, 4 device error.
Command_Error_Code	AO	900 for local validation; otherwise Manager/PRM error code.
Wireless_Signal_Level	AO	First numeric value found in the wireless readback line, when present. Use Wireless_Signal_Text\$ as the raw truth.
Plug_SN\$	SO	CoolPlug serial number from the S/N line in settings readback.
Status_Text\$	SO	Plain text command state.
Last_Command\$	SO	Last raw PRM command emitted through Manager.
Last_Response\$	SO	Raw helper response lines received from Manager.
Wireless_Signal_Text\$	SO	Raw wireless readback line from plug <UID> wlan .
Last_Error\$	SO	Most recent validation/device error text.
To_Manager\$	SO	CPHELPER messages wired to Manager From_Zone_Modules\$.

Temperature Source Choices

Choice	Meaning
Default	CoolPlug chooses by priority: external sensor, feed command, wall thermostat if available, then indoor return-air sensor.
Indoor	Use the indoor unit return-air sensor.
Feed	Use the temperature sent by a CoolAutomation feed command.
External	Use the sensor physically connected to the CoolPlug.

PRM Error Codes

The Manager's **Last_Exit_Code** analog output holds the most recent code. Zone modules surface command-specific errors via **Command_Error_Code** and **Command_Error_Text\$**. Common codes encountered during commissioning and operation:

Code	Meaning	Notes
0	OK	Command executed successfully.
1	No UID	Unit address not found. Check the child module UID string input or the target UID in the command.
2	Not Strict UID	UID must be exact format (e.g., L1.001 not L1.1).
3	Bad Format	Command syntax error.
4	Failed	Command execution failed.
101	Unsupported Feature	This command is not supported by the indoor unit type.
102	Incorrect Indoor Type	Indoor unit doesn't support this command or parameter.
103	No ACK From Indoor	Indoor unit not responding -- check HVAC wiring.
104	Time Out on Receive	No response from indoor unit within timeout period.
107	Line Error	Error on HVAC communication line.
108	Feed Disabled	Indoor unit can't accept ambient feed -- check unit switch position.
200	UID Not Found	Unit not in device database. Verify UID and device connection.
700	No Sensors	No SMT-IO sensors attached. Sensor polling auto-disabled.
701	Sensor Error	Sensor I/O error.

See **Appendix A** for the full PRM error code reference (codes 0-310, 700-701).

Appendix A -- PRM Error Code Reference

Complete error code table from CoolMaster Product Line PRM Rev 0.10, Section 6.1.2. Codes are returned by the device as **ERROR:N** on the PRM bus.

Code	Verbose	Description
0	OK	Command executed successfully.
1	No UID	Unit not found.
2	Not Strict UID	UID must be precise.
3	Bad Format	Command format is wrong.
4	Failed	Command execution failed.
5	Line Unused	Line is unused.
6	Unknown Command	Command is unknown.
7	Bad HVAC Line	Line number is wrong.
8	Bad Function	Wrong function.
9	Bad Line Type	Wrong line type definition.
10	Bad Parameter	Command parameter is wrong.
11	OK, Boot Required	Command will take effect after reboot.
12	Wrong GPIO	Wrong GPIO.
13	SDDP Disabled	SDDP module is disabled; enable it to proceed.
14	Virtual Address In Use	Virtual address already in use.
15	Bad Property	Wrong property.
16	Number of Lines Exceeded	Can't define more line types.
17	Dip Switch State Incorrect	Dip switch state is incorrect for defined line type.
18	SDDP Not Initialized	SDDP is enabled but Ethernet link is still down.
80	ModBus Error 80	No response from the addressee.
81	ModBus Error 81	Big timeout between bytes in received message.
82	ModBus Error 82	Small timeout between bytes in received message.
83	ModBus Error 83	Received message with internal timeout.
84	ModBus Error 84	Received message is too big.
85	ModBus Error 85	CRC error in received message.
86	ModBus Error 86	ModBus exception in response.
100	Collision	Collision in sent command on HVAC line.
101	Unsupported Feature	Unsupported command or parameter for this HVAC line.
102	Incorrect Indoor Type	Indoor unit doesn't support this command or parameter.
103	No ACK From Indoor	Indoor unit didn't acknowledge sent command.

Code	Verbose	Description
104	Time Out on Receive	No response from indoor unit.
105	CS Error In Received Message	Check sum error in received message.
106	Line Init In Progress	Can't show line status during initialization.
107	Line Error	Error on the HVAC line.
108	Feed Disabled	Indoor unit can't receive ambient temperature due to switch position.
150	HDL Not Initialized	HDL line not defined or Ethernet cable unplugged.
151	HDL DB Overflow	HDL Data Base full; can't add new configuration.
152	HDL Eth Disabled	HDL over Ethernet disabled.
200	UID Not Found	Specified indoor unit not found in Data Base.
201	Strict UID Not Found	Specified indoor unit not found by strict UID.
202	Indoor Removed	Indoor unit removed from Data Base.
203	DB Overflow	Indoor Units Data Base full; can't add new one.
204	Group DB Overflow	Group Data Base full; can't add new group.
205	VA DB Overflow	Virtual address Data Base full; can't assign new virtual address.
206	FDBS Overflow	Properties Data Base full; can't add new property.
250	Link DB Overflow	Link Data Base full; can't link new CoolPlug device.
251	No CooHub Line	CooHub line not defined; define it to proceed.
252	Auto Visibility Failed	Error adding visibility props during link creation.
253	Link Already Exists	CoolPlug device already linked; delete existing link first.
307	KNX DB Overflow	KNX Data Base full; can't add new group.
309	KNX Not Connected	No connection with KNX chip.
310	KNX Line Not Started	KNX line not defined.
700	No Sensors	No SMT-IO sensors attached. Sensor polling auto-disabled after first occurrence.
701	Sensor Error	Sensor I/O error.

Appendix B – CoolPlug PBUS Status Codes

CoolPlug zones can report CP status codes in the PRM fail/status field. The Zone module expands these in `Status_Fb$` and raises `In_Error_Fb`.

Code	Description
CP01	CoolPlug has no connection to the HVAC unit.
CP02	No communication with the CoolPlug device.
CP03	CoolPlug device is in boot mode.
CP04	CoolPlug is not properly configured.
CP05	CoolPlug cannot detect the HVAC unit.

Revision History

Rev	Date	Notes
1.0.5	October 2026	Production patch: persistent Manager poller, LF-framed bounded child parsers, atomic Mode+ON ordering, and a 30-second acknowledgement-renewed setpoint hold. Install the five-module matched set.
1.0.4	September 2026	Production patch: fixes Zone manager-bus string parsing bounds for STATE, NAME, and ZONEERR handling.
1.0.3	August 2026	Production patch: enables Zone louver/swing and filter-reset commands and keeps Manager console trace output gated by Debug.
1.0.2	August 2026	Production patch: gates Manager console trace output behind the Debug input while preserving explicit debug outputs.
1.0.1	August 2026	Production patch: suppresses routine automatic empty-line No UID poll noise from Manager diagnostics and corrects Zone/HOA Zone UID documentation.
1.0.0	August 2026	First official public release: Manager TX\$/RX\$ transport pins, Inter_Command_Gap_Sec pacing, Zone Send_ON_With_Mode, CoolPlug Helper online/offline feedback, one-shot wireless readback, refreshed pin-face layouts, and production help.
0.9.2	July 2026	Prerelease update: adds the simplified CoolPlug Helper commissioning module with pulse-based source and master/slave controls.
0.9.1	July 2026	Prerelease help update: adds HOA Zone, Edge aserver setup note, CoolPlug PBUS status codes, Fahrenheit Is polling behavior, and HOA C-unit readback clarification.
0.9.0	May 2026	Prerelease baseline: Manager, Zone, and Sensor modules with TCP/IP and RS-232 transport.