

## Systems Integration

# APOGEE® Integration to Trane LONWORKS® Devices: AH540/541 Air Handler Controller

Table 1. AH540/541 APOGEE Points, Application Number: 9027, Program ID: 80:00:2A:56:0A:03:04:01.

Point	Type	Description	Range/Units <sup>a b c</sup>
1	LENUM	Occupancy Scheduler Input Current State	0=Oc_Occupied 1=Oc_Unoccupied 2=Oc_Bypass 3=Oc_Standby 255=Oc_Nul
2	LENUM	Occupancy Scheduler Input Next State	0=Oc_Occupied 1=Oc_Unoccupied 2=Oc_Bypass 3=Oc_Standby 255=Oc_Nul
3	LAO	Occupancy Scheduler Input Time to Next State	min
4	LAI	Discharge Air Temperature Output	°F °C
5	LENUM	Unit Status Output Mode	See Table 2
6	LAI	Unit Status Output Primary Heat	%
7	LAI	Unit Status Output Secondary Heat	%
8	LAI	Unit Status Output Cool	%
9	LAI	Unit Status Output Economizer	%
10	LAI	Unit Status Output Fan	%
11	LDI	Unit Status Output Alarm	Normal/Alarm
12	LENUM	Occupancy Input	0=Oc_Occupied 1=Oc_Unoccupied 2=Oc_Bypass 3=Oc_Standby 255=Oc_Nul
13	LENUM	Application Mode	See Table 2

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**Table 1. AH540/541 APOGEE Points, Application Number: 9027, Program ID: 80:00:2A:56:0A:03:04:01. (continued)**

Point	Type	Description	Range/Units <sup>a b c</sup>
14	LENUM	Emergency Command Input	0=Emerg_Normal 1=Emerg_Pressurize 2=Emerg_Depressurize 3=Emerg_Purge 4=Emerg_Shutdown 5=Emerg_Fire 255=Emerg_Nul
15	LAO	Duct Static Pressure Input	IWC PA PaPa
16	LAO	Duct Static Pressure Setpoint Input	IWC PA PaPa
17	LAO	Discharge Air Cooling Setpoint Input	°F °C
18	LAO	Discharge Air Heating Setpoint Input	°F °C
29	LAO	Economizer Enable Input Value	%
30	LAO	Economizer Enable Input State	–
31	LAO	Outdoor Air Minimum Position Input	%
33	LAO	Outdoor Air Temperature Input	°F °C
39	LAO	Space Temperature Input	°F °C
51	LAI	Effective Discharge Air Temperature Setpoint Output	°F °C
52	LAI	Duct Static Pressure Output	IWC PA PaPa
53	LAI	Effective Duct Static Pressure Setpoint Output	IWC PA PaPa
54	LENUM	Effective Heat/Cool Output	See Table 2
55	LENUM	Application Mode Output	See Table 2
56	LENUM	Occupancy Output	0=Oc_Occupied 1=Oc_Unoccupied 2=Oc_Bypass 3=Oc_Standby 255=Oc_Nul
57	LAI	Supply Fan Status Output Value	%
58	LDI	Supply Fan Status Output State	Off/On
59	LAI	Supply Fan On/Off Control Output Value	%
60	LDI	Supply Fan On/Off Control Output State	Off/On

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**Table 1. AH540/541 APOGEE Points, Application Number: 9027, Program ID: 80:00:2A:56:0A:03:04:01. (continued)**

Point	Type	Description	Range/Units <sup>a b c</sup>
62	LAI	Exhaust Fan Status Output Value	%
63	LDI	Exhaust Fan Status Output State	Off/On
64	LAI	Exhaust Fan On/Off Control Output Value	%
65	LDI	Exhaust Fan On/Off Control Output State	Off/On
75	LAI	Economizer Enabled Output Value	%
76	LDI	Economizer Enabled Output State	Disabled/Enabled
77	LAI	Outdoor Air Damper Output	%
79	LAI	Local Outdoor Air Temperature Output	°F °C
80	LAI	Outdoor Air Temperature Output	°F °C
84	LAI	Primary Cooling Output	%
85	LAI	Primary Heating Output	%
86	LAI	Mixed Air Temperature Output	°F °C
87	LAI	Space Temperature Output	°F °C
114	LENUM	Valve Override State	See Table 3
115	LAO	Valve Override Percent	%
116	LAO	Valve Override Flow	cfm Lps
117	LAI	Face & Bypass Damper Position	%
118	LAI	Local Duct Static Pressure Setpoint	IWC PA PaPa
119	LENUM	Heat/Cool Mode Input	See Table 2
120	LENUM	Occupancy Sensor Input	0=Oc_Occupied 1=Oc_Unoccupied 2=Oc_Bypass 3=Oc_Standby 255=Oc_Nul
121	LAO	Temperature Setpoint Input	°F °C
122	LAO	Setpoint Offset Input	°F °C

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**Table 1. AH540/541 APOGEE Points, Application Number: 9027, Program ID: 80:00:2A:56:0A:03:04:01. (continued)**

Point	Type	Description	Range/Units <sup>a b c</sup>
123	LAO	Setpoint Shift Input Occupied Cool	°F °C
124	LAO	Setpoint Shift Input Standby Cool	°F °C
125	LAO	Setpoint Shift Input Unoccupied Cool	°F °C
126	LAO	Setpoint Shift Input Occupied Heat	°F °C
127	LAO	Setpoint Shift Input Standby Heat	°F °C
128	LAO	Setpoint Shift Input Unoccupied Heat	°F °C
129	LAI	Effective Setpoint Output	°F °C
130	LAI	Fan Speed Output Value	%
131	LAI	Fan Speed Output State	–
132	LAI	Setpoint Output	°F °C
200	LAO	Occupancy Temperature Setpoint Occupied Cool	°F °C
201	LAO	Occupancy Temperature Setpoint Standby Cool	°F °C
202	LAO	Occupancy Temperature Setpoint Unoccupied Cool	°F °C
203	LAO	Occupancy Temperature Setpoint Occupied Heat	°F °C
204	LAO	Occupancy Temperature Setpoint Standby Heat	°F °C
205	LAO	Occupancy Temperature Setpoint Unoccupied Heat	°F °C
206	LAO	Receive Heartbeat CP Input	sec
207	LAO	Local Bypass Time CP Input	min
210	LAO	Discharge Air Temperature Heating Setpoint CP Input	°F °C
211	LAO	Discharge Air Temperature Heating Setpoint CP Input	°F °C
212	LAO	Duct Static Pressure Limit CP Input	IWC PA PaPa

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**Table 1. AH540/541 APOGEE Points, Application Number: 9027, Program ID: 80:00:2A:56:0A:03:04:01. (continued)**

Point	Type	Description	Range/Units <sup>a b c</sup>
213	LAO	Duct Static Pressure Setpoint CP Input	IWC <i>PA PaPa</i>
214	LAO	Exhaust Start Position CP Input	%
215	LAO	Mixed Air Temperature Low Limit CP Input	°F °C
216	LAO	Maximum Discharge Air Temperature Cooling Setpoint CP Input	°F °C
217	LAO	Maximum Discharge Air Temperature Heating Setpoint CP Input	°F °C
218	LAO	Maximum Duct Static Pressure Setpoint CP Input	IWC <i>PA PaPa</i>
219	LAO	Minimum Discharge Air Temperature Cooling Setpoint CP Input	°F °C
220	LAO	Minimum Discharge Air Temperature Heating Setpoint CP Input	°F °C
221	LAO	Minimum Duct Static Pressure Setpoint CP Input	IWC <i>PA PaPa</i>

<sup>a</sup> Values noted for LDIs and LDOs are in the following format: OFF text/ON text.  
<sup>b</sup> This column indicates the value/range or engineering units or both if known.  
<sup>c</sup> The default English value is not italicized. An italicized entry indicates an SI value.

**Table 2. HVAC Mode/Status (hvac\_t).**

Value	Description
0	Hvac_Auto
1	Hvac_Heat
2	Hvac_Mrng_Wrmup
3	Hvac_Cool
4	Hvac_Night_Purge
5	Hvac_Pre_Cool
6	Hvac_Off
7	Hvac_Test
8	Hvac_Emerg_Heat
9	Hvac_Fan_Only
10	Hvac_Free_Cool
11	Hvac_Ice
255	Hvac_Nul

**Table 3. HVAC Override Type (hvac\_overid\_t).**

<b>Value</b>	<b>Description</b>
0	Hvo_Off
1	Hvo_Position
2	Hvo_Flow_Value
3	Hvo_Flow_Percent
4	Hvo_Open
5	Hvo_Close
6	Hvo_Minimum
7	Hvo_Maximum
8	Hvo_Unused8
9	Hvo_Unused9
10	Hvo_Unused10
11	Hvo_Unused11
12	Hvo_Unused12
13	Hvo_Unused13
14	Hvo_Unused14
15	Hvo_Unused15
16	Hvo_Unused16
17	Hvo_Position_1
18	Hvo_Flow_Value_1
19	Hvo_Flow_Percent_1
20	Hvo_Open_1
21	Hvo_Close_1
22	Hvo_Minimum_1
23	Hvo_Maximum_1
24	Hvo_Unused24
25	Hvo_Unused25
26	Hvo_Unused26
27	Hvo_Unused27
28	Hvo_Unused28
29	Hvo_Unused29
30	Hvo_Unused30
31	Hvo_Unused31
32	Hvo_Unused32
33	Hvo_Position_2

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**Table 3. HVAC Override Type (hvac\_overid\_t). (continued)**

<b>Value</b>	<b>Description</b>
34	Hvo_Flow_Value_2
35	Hvo_Flow_Percent_2
36	Hvo_Open_2
37	Hvo_Close_2
38	Hvo_Minimum_2
39	Hvo_Maximum_2
40	Hvo_Unused40
41	Hvo_Unused41
42	Hvo_Unused42
43	Hvo_Unused43
44	Hvo_Unused44
45	Hvo_Unused45
46	Hvo_Unused46
47	Hvo_Unused47
48	Hvo_Unused48
255	Hvo_Nul

Table 4. AH540/541 LONWORKS Network Variables, Program ID: 80:00:2A:56:0A:03:04:01.

Point	NVO Name	NVI Name	CP Name
1	-	nviOccSchedule.current_state	nviOccSchedule.current_state
2	-	nviOccSchedule.next_state	nviOccSchedule.next_state
3	-	nviOccSchedule.time_to_next_state	-
4	nvoDischAirTemp	-	-
5	nvoUnitStatus.mode	-	-
6	nvoUnitStatus.heat_output_primary	-	-
7	nvoUnitStatus.heat_output_secondary	-	-
8	nvoUnitStatus.cool_output	-	-
9	nvoUnitStatus.econ_output	-	-
10	nvoUnitStatus.fan_output	-	-
11	nvoUnitStatus.in_alarm	-	-
12	-	nviOccManCmd	nviOccManCmd
13	-	nviApplicMode	nviApplicMode
14	-	nviEmergOverride	nviEmergOverride
15	-	nviDuctStatPress	nviDuctStatPress
16	-	nviDuctStaticSP	nviDuctStaticSP
17	-	nviDACISP	nviDACISP
18	-	nviDAHtSP	nviDAHtSP
29	-	nviEconEnable.value	nviEconEnable.value
30	-	nviEconEnable.state	nviEconEnable.state
31	-	nviOAMinPos	nviOAMinPos
33	-	nviOutdoorTemp	nviOutdoorTemp
39	-	nviSpaceTemp	nviSpaceTemp
51	nvoEffDTempSP	-	-
52	nvoDuctStatPress	-	-
53	nvoEffDuctStatSP	-	-
54	nvoHeatCool	-	-
55	nvoApplicMode	-	-
56	nvoEffectOccup	-	-

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Table 4. AH540/541 LONWORKS Network Variables, Program ID: 80:00:2A:56:0A:03:04:01. (continued)

Point	NVO Name	NVI Name	CP Name
57	nvoSupFanStatus.value	-	-
58	nvoSupFanStatus.state	-	-
59	nvoSupFanOnOff.value	-	-
60	nvoSupFanOnOff.state	-	-
62	nvoExhFanStatus.value	-	-
63	nvoExhFanStatus.state	-	-
64	nvoExhFanOnOff.value	-	-
65	nvoExhFanOnOff.state	-	-
75	nvoEconEnabled.value	-	-
76	nvoEconEnabled.state	-	-
77	nvoOADamper	-	-
79	nvoLocalOATemp	-	-
80	nvoOutdoorTemp	-	-
84	nvoCoolPrimary	-	-
85	nvoHeatPrimary	-	-
86	nvoMATemp	-	-
87	nvoSpaceTemp	-	-
114	-	nviValveOverride.state	nviValveOverride.state
115	-	nviValveOverride.percent	nviValveOverride.percent
116	-	nviValveOverride.flow	nviValveOverride.flow
117	nvoFBDamper	-	-
118	nvoLocalIDSPress	-	-
119	-	nviHeatCool	nviHeatCool
120	-	nviOccSensor	nviOccSensor
121	-	nviSetpoint	nviSetpoint
122	-	nviSetptOffset	nviSetptOffset
123	-	nviSetptShift.occupied_cool	nviSetptShift.occupied_cool
124	-	nviSetptShift.standby_cool	nviSetptShift.standby_cool
125	-	nviSetptShift.unoccupied_cool	nviSetptShift.unoccupied_cool

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Table 4. AH540/541 LONWORKS Network Variables, Program ID: 80:00:2A:56:0A:03:04:01. (continued)

Point	NVO Name	NVI Name	CP Name
126	-	nviSetptShift.occupied_heat	nviSetptShift.occupied_heat
127	-	nviSetptShift.standby_heat	nviSetptShift.standby_heat
128	-	nviSetptShift.unoccupied_heat	nviSetptShift.unoccupied_heat
129	nvoEffectSetpt	-	-
130	nvoFanSpeed.value	-	-
131	nvoFanSpeed.state	-	-
132	nvoSetpoint	-	-
200	-	-	nciSetpoints.occupied_cool
201	-	-	nciSetpoints.standby_cool
202	-	-	nciSetpoints.unoccupied_cool
203	-	-	nciSetpoints.occupied_heat
204	-	-	nciSetpoints.standby_heat
205	-	-	nciSetpoints.unoccupied_heat
206	-	-	nciSndHrtBt
207	-	-	nciBypassTime
210	-	-	nciDACISP
211	-	-	nciDAHSP
212	-	-	nciDuctStatLim
213	-	-	nciDuctStatSP
214	-	-	nciExhStartPos
215	-	-	nciMALowLimitSP
216	-	-	nciMaxDACISP
217	-	-	nciMaxDAHtSP
218	-	-	nciMaxDuctStatSP
219	-	-	nciMinDACISP
220	-	-	nciMinDAHtSP
221	-	-	nciMinDuctStatSP



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