PDM 32

All names in this document have the type in capitals as the last characters in the name.

CabinFanDI is a Digital Input.

GPSSpeed is a GPS data packet.

EngineTempAI is an Analogue Input, a temperature sensor on the coolant pipework.

RadFanO is an Output.

SafeIgnition is an internal variable which =1 when the dash is on otherwise =0

FAN

There are a number of fans in a car and a number of ways to cause them to operate and to stop.

All fans are inductive loads and the speed of turn on and off is not critical, the inrush and back emf caused by sudden starting and stopping can cause component failure and for that reason it is recommended that a fan be started and stopped using the soft start and soft stop of 2 seconds or more.

Radiator FAN

First, we will look at implementing a radiator cooling fan. The fan is only needed if the temperature of the coolant exceeds 40°C. It is not needed to be on if the vehicle speed is 60 mph or more as at that speed the fan is adding to the drag of the vehicle if it isn't moving faster than the incoming air. If it is not powered, it will windmill at the incoming air speed.

I will choose a medium power output for the fan as the current is expected to be about 15A max in continuous operation. If your fan needs more current you should use a high power output. Some cars have multiple fans and they can be powered on different outputs to come on at different temperatures.

This is the implementation of a start stop fan with those conditions.

1	🔤 Modify Output Signal	٥	\times
ł	Mid Power Out 1 on Black Connector (35 Pin Male) Pin: 2;		
i.	Name: RadFanO Store values at Frequency 10 Hz		
2	Settings Related Channels		
	Continuous PWM Square Wave Maximum Value of Requested Load (up to 15.0.A) 15 A		
1	Over Current Latch-Off Time 0.5 sec		
σ	Soft Start in a time of 2 sec Number of Retries 1		
,	✓ Soft Stop in a time of 2 sec Retry Delay 0.5 sec		
4	Minimum Current O A		
9	Check Open Load in Off State		
	Same condition for activation and deactivation		
÷	Set status to ON when following condition is verified for at least 0 sec		
1	Set status to OFF when following condition is not verified for at least 0 sec		
1	EngineTempAl greaterthan 40 C immediately		
÷	AND ÷		
1	GPS Speed less than 60 mph immediately		
1	Add		
1	Add		

It is also possible to have the fan controlled by a PWM (pulse with modulation) output which for example could start at 40C with 30% of power and have 60% power at 60C and go to 100% power at 85C. In all these cases the fan will lose power if the car is traveling in excess of 60mph.

Here is how to implement that scenario

Modify Output Signal	- 0	×
Mid Power Out 2 on Black Connector (35 Pin Male) Pin: 3;		
lame : RadFan2O Store values at Frequency 10 H	z 🔶	
Settings Related Channels		
Continuous PWM Square Wave Soft Start in a time of 2 sec Soft Stop in a time of 2 sec PWM based on frequency of 100 Hz	Maximum Value of Requested Load (up to 15.0 A) 15 A Over Current Latch-Off Time 0.5 sec Number of Retries 1 Retry Delay 0.5 sec Minimum Current 0 A Check Open Load in Off State	
Set PWM Duty Cycle to 30 % when following condition is verified for at least 0 Engine TempAI between values (40;60) C immediately AND c	sec 🕹	© priorit
GPS Speed less than 60 mph immediately Add Add Set PWM Duty Cycle to 60 % when following condition is verified for at least 0	Add sec	ġ.
EngineTempAl between values (60; 85) C immediately AND CPS Speed less than 60 mph immediately Add Add	Add Add	
Set PWM Duty Cycle to 100 % when following condition is verified for at least 0	sec	3
EngineTempAl greater than 85 C immediately AND ÷ GPS Speed less than 60 mph immediately Add	Add Add	

Cabin Air Circulation FAN

Another widely used fan is the cabin fan and the air directed to windscreen, face and feet.

In this instance I am not concerning myself with the heating ,direction, recirculation and ducting but only how the fan is turned on for different speeds and turned off.

Here I am introducing a multi position button with a pressed time different function.

🕎 Channel Settings						×	
Name	CabinFanDI						
	O Analog				igital	(i)	
Function	Digital Status					¢	
Sensor	Status						
Sampling Frequency	20 Hz						
	Logged						
Active when signal is:	Close to ground Close to VBatt						
	Use internal pull down 10kΩ						
	O Momentary O Toggle			M	ultipositio	n	
	✓ use as button with pressure time dependent status						
		r short/long pre			0.5		
	0 0	OFF	S1 💲			[+	
	1 1 2 2	S1 S2	S2 💲	OF		[+	
	2 2 3 3	S3	S3 🛟	OF	F 🗧 [- F 🗘 [-	[+ [+	
	5 5	00			· • [
			Save		Canc	el	

The user can go immediately to high speed from off if they press the fan button for longer than half a second. Short presses advance from 0 to 3 and back to 0.

Implementing an output for this scenario is like this;

Mid Power Out 3 on Black Connector (35 Pin Male) Pin: 4; Name: CabinFanO Store values at Frequency 10 Hz	J X
Name : CabinFanO Store values at Frequency 10 Hz	
Setting Delated Changel	
3 Settings Related Channels	
A Continuous O PWM Square Wave Maximum Value of Requested Load (up to 15.0 A) 15 A	
Over Current Latch-Off Time 0.5 sec	
The Soft Start in a time of 2 sec Number of Retries 1	
Soft Stop in a time of 2 sec Retry Delay 0.5 sec	
PWM based on frequency of 100 Hz	
Check Open Load in Off State	
-	
4	
Set PWM Duty Cycle to 40 % when following condition is verified for at least 0 sec	© ↑ priority
Safelgnition equal to 1 # immediately	
AND +	
CabinFanDI equal to S1 immediately	
Add	
Add	
Set PWM Duty Cycle to 75 % when following condition is verified for at least 0 sec	∰ t
	.
Safelgnition equal to 1 # immediately	
AND e	
CabinFanDI equal to S2 immediately	
Add	
Add	
Set PWIM Duty Cycle to 100 % when following condition is verified for at least 0 sec	ø
Patalanillan anualta 4.11 immandialah	
Safelgnition equal to 1 # immediately Add	
CabinFanDI equal to S3 immediately	
Add	
Add	