EXAMPLE NAME: PMSM_FOC_EXAMPLE_XMC44

OVERVIEW: This example demonstrates speed control of motor using V/f with smooth transition to FOC closed loop start up technique. Speed of the motor is changed by potentiometer input value.

DESCRIPTION:

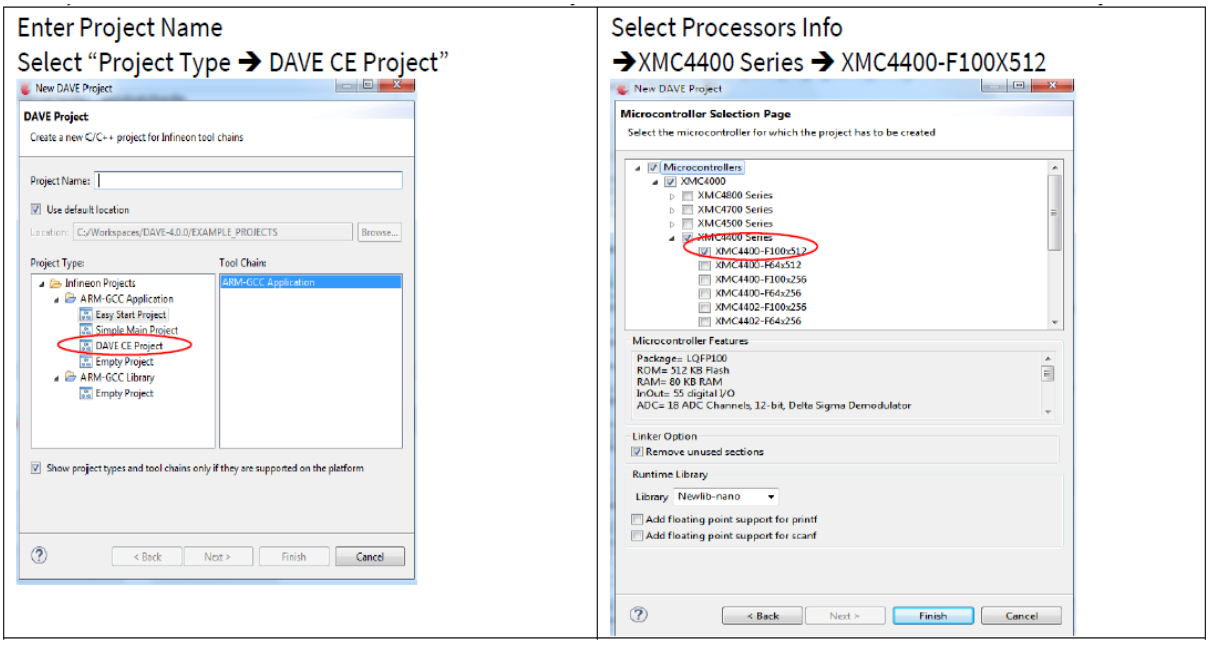
- Potentiometer (P14.1) is used as analog input to change the speed of the motor.
- Motor will stop when input is less than 10% and motor will restart when input increases beyond 10%.

REQUIRMENTS:

Boards Required: XMC4400 Motor Control Kit, Part Number: KIT_XMC44_AE3_001

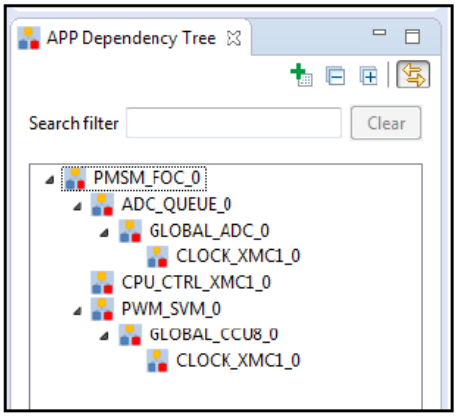
HOW TO CREATE THE PROJECT:

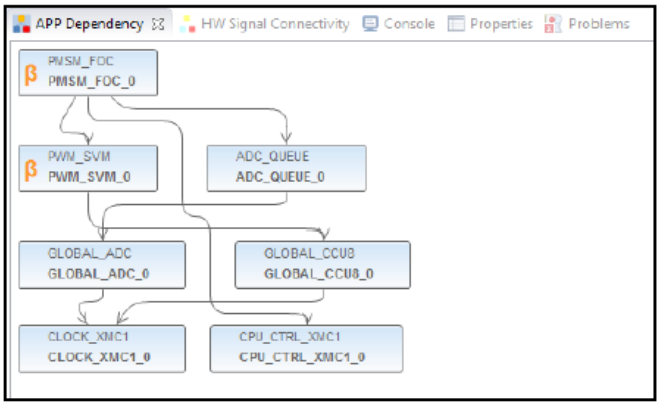
1. Open the DAVE CE and use “Add IDE New Project Wizard” on the toolbar to add a new DAVE Project.



2. Use the "Add New APP" in the toolbar to add PMSM_FOC APP. Configure the App instances with the following configurations.

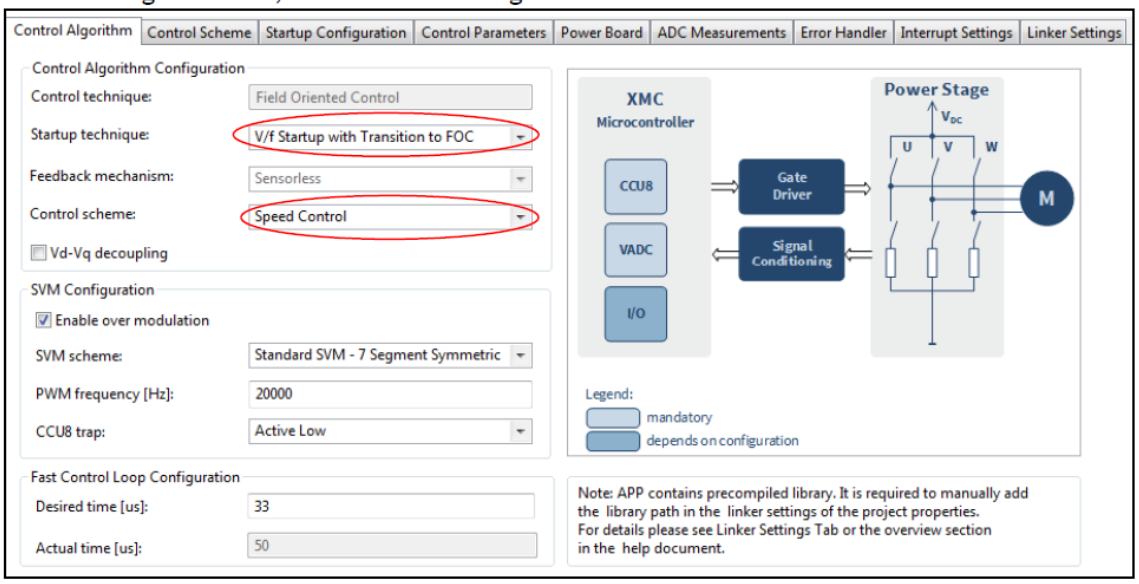
Views: App Dependency Tree and App Dependency



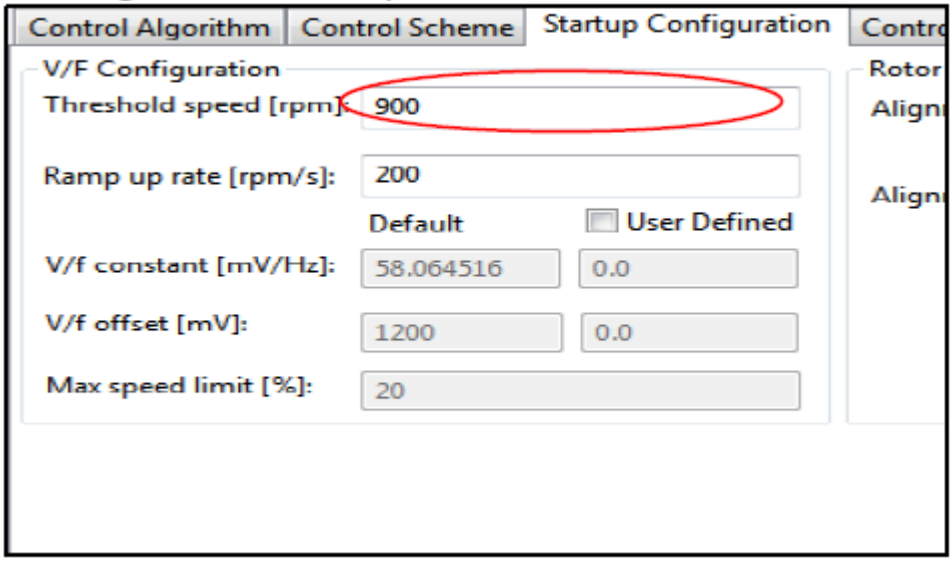


PMSM_FOC APP configurations:

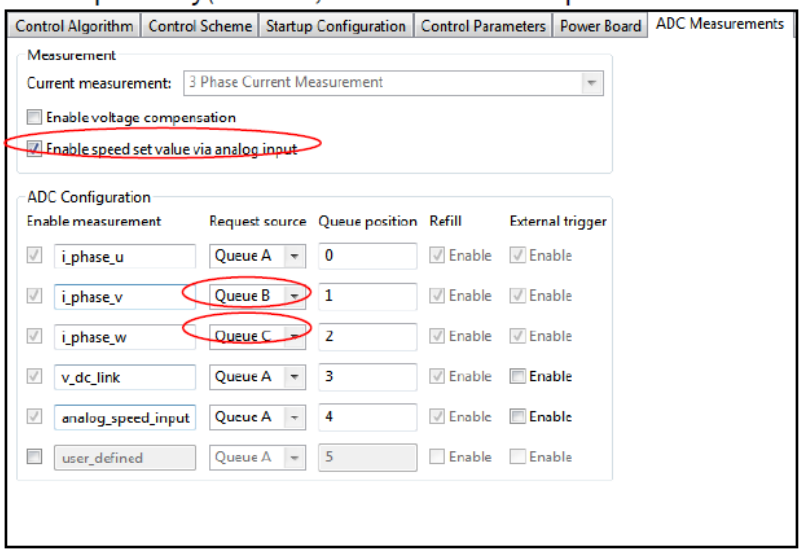
- In Control Algorithm tab, ensure below settings



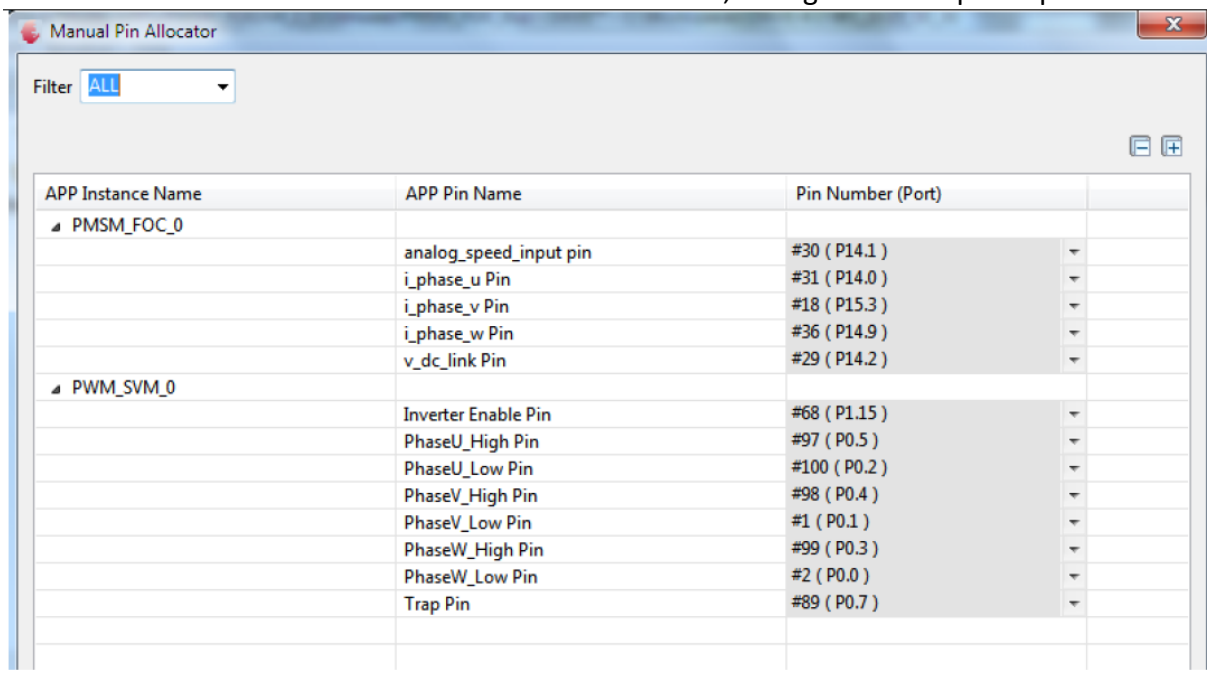
-Change threshold speed



- In ADC Measurements tab, select “Enable speed set value via analog input”
- Change request source for “i_phase_v” and “i_phase_w” entry to “Queue B” and “Queue C” respectively(Phase U, Phase V & Phase W pins are from three different ADC groups).



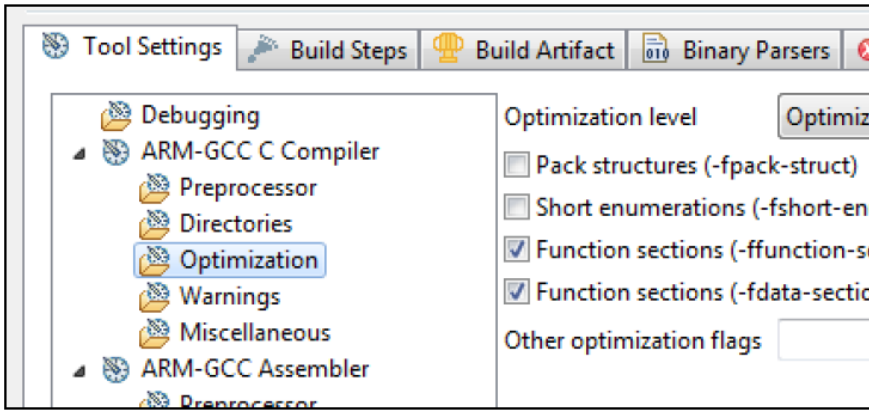
3. Use the "Manual Pin Allocator" found in the toolbar, configure the required pins



Generate the code for configurations made by using in toolbar and call PMSM_FOC_MotorStart(&PMSM_FOC_0); in main.c

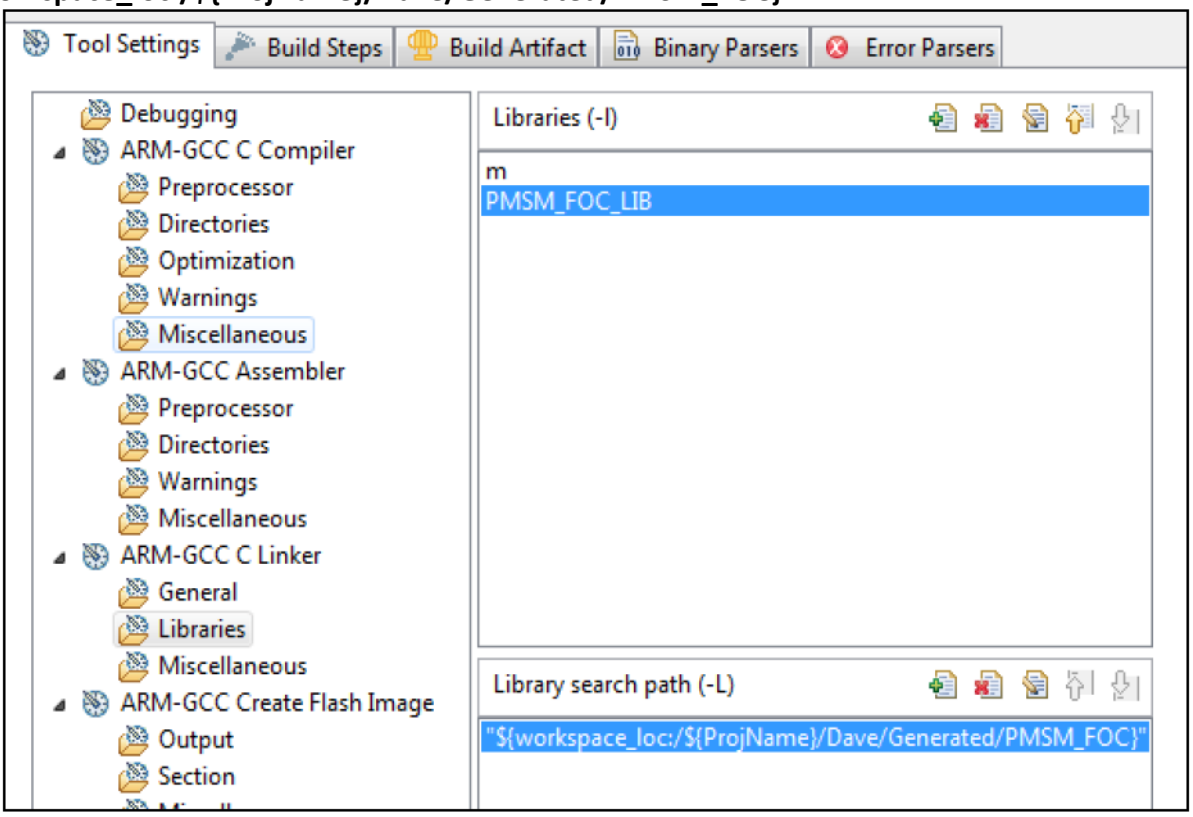
5. Use the “Active Project Properties” found in the toolbar to change the compiler and linker settings.

- Compiler Settings to use optimization level 3



- Linker settings to add the library path

-l as **PMSM_FOC_LIB**
-L as
${workspace_loc:/${ProjName}/Dave/Generated/PMSM_FOC}



6. Build and download to the microcontroller.

NOTE: The motor control kit “KIT_XMC44_AE3_001” does not have inbuilt bias voltage supply, so this project uses DAC peripheral to generate current amplifier bias voltage of 1.65V.

HOW TO TEST:

Download and run the demo in the uC.

OBSERVATIONS:

- Motor starts running in open loop and switches to closed loop at the threshold speed defined in the GUI.
- Speed of the motor changes as potentiometer value changes.
- Motor stops if the potentiometer input is less 10% and restarts as potentiometer increases beyond 10%.
- Motor runs at no load speed when potentiometer input is maximum.

HINTS WHEN MIGRATING EXAMPLE TO OTHER DEVICES IN THE SAME XMC FAMILY:

No additional information is required.