EXAMPLE NAME: PDM_DIMMED_LED_LAMP_CCM_BUCK_RGB_SHIELD_EXAMPLE_1_XMC12

OVERVIEW: This example demonstrates how use the PDM_DIMMED_LED_LAMP APP to control a 3-channel Continuous Conduction Mode (CCM) Buck to drive an RGB lamp.

DESCRIPTION:

- PDM_DIMMED_LED_LAMP APP drives an RGB lamp using 3 PDM_BCCU, 3 PWM_CCU4 , 3 COMP_REF APPs and a DIM_BCCU APP.
- SYSTIMER APP provides a periodic 1s interrupt for changing lamp color and dim level.

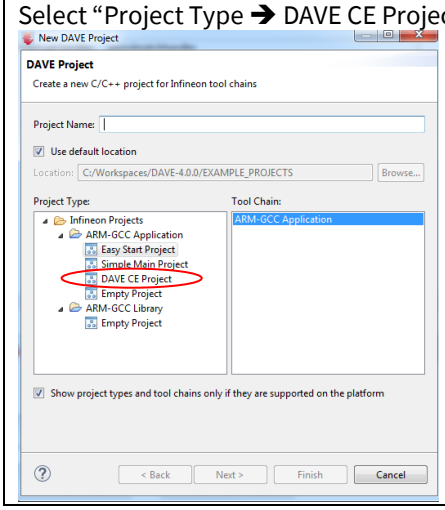
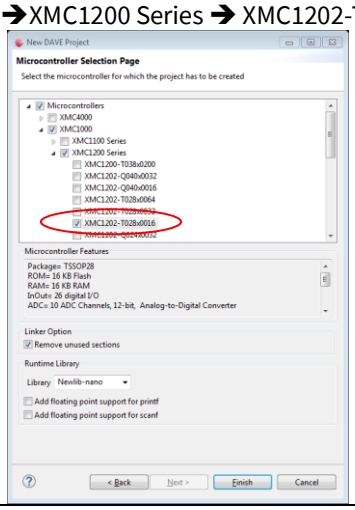
REQUIREMENTS:

Boards Required: RGB LED Lighting Shield (Order Nr: KIT_LED_XMC1202_AS_01)

Additional hardware: 24V DC Power Supply, a constant-current RGB LED with average current rating = 450mA
DAVE Version: 4.1.4

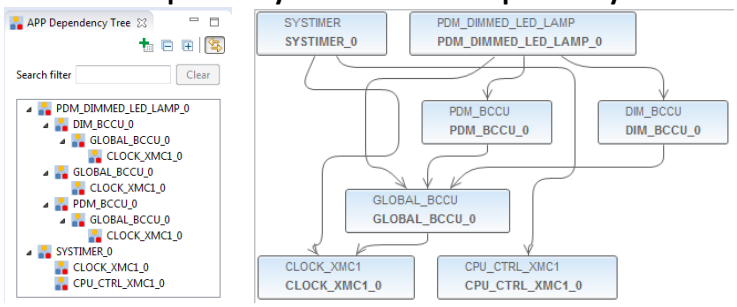
HOW TO CREATE THE PROJECT:

1. Open the DAVE CE and use  "Add IDE New Project Wizard" shortcut in the toolbar to add a new DAVE Project.

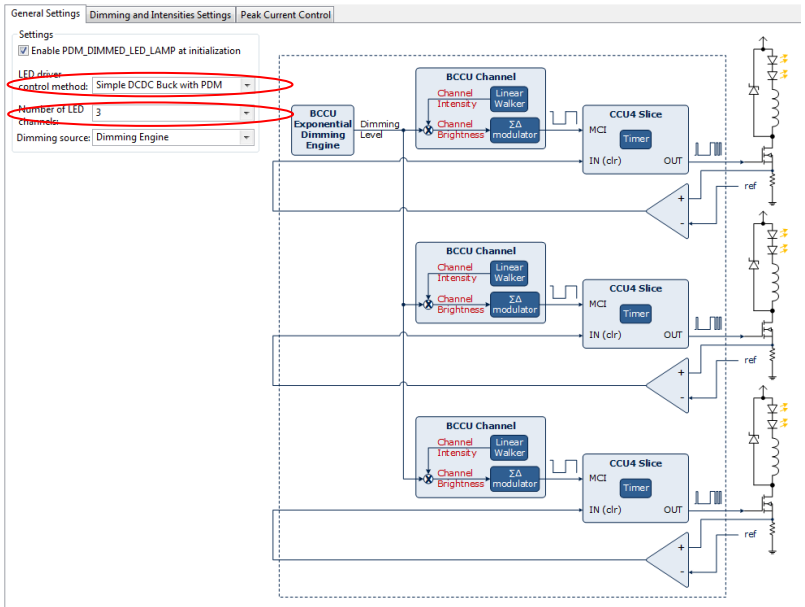
Enter Project Name Select "Project Type ➔ DAVE CE Project"	Select Processors Info ➔XMC1200 Series ➔ XMC1202-T028x0032
	

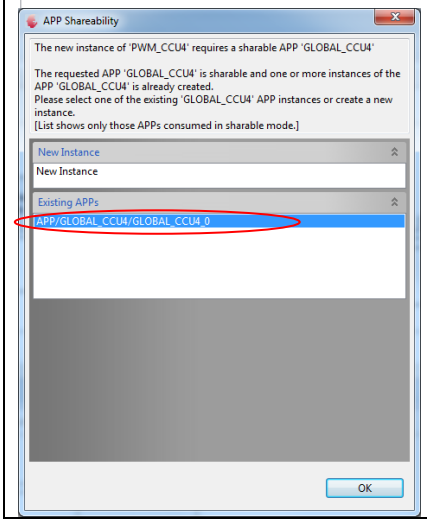
2. Use the  "Add New App" shortcut in the toolbar to add 1 instance of PDM_DIMMED_LED_LAMP and 1 instance of SYSTIMER APP. Configure the APP instances with the following configurations.

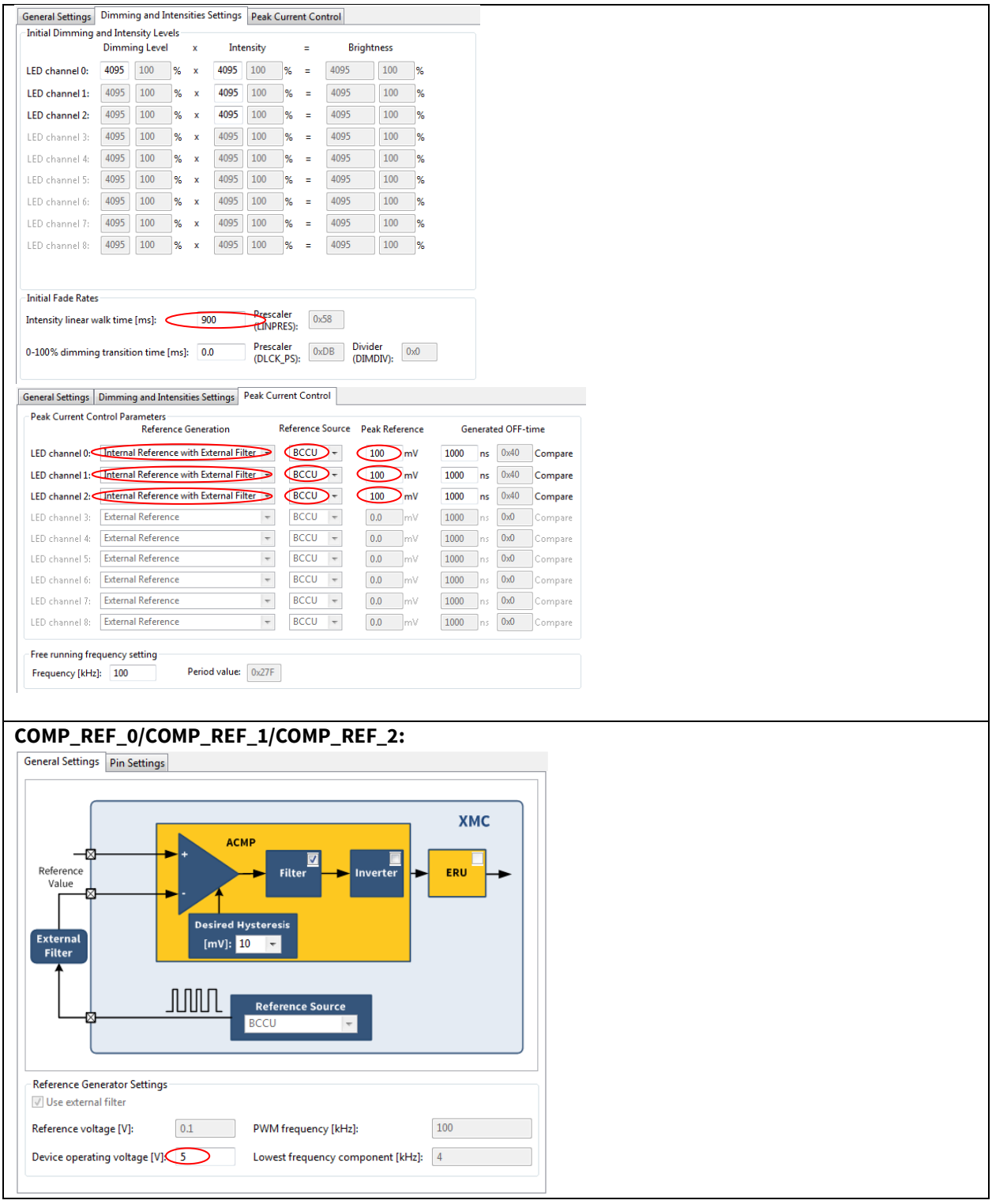
Views: APP Dependency Tree and APP Dependency



PDM_DIMMED_LED_LAMP_0:

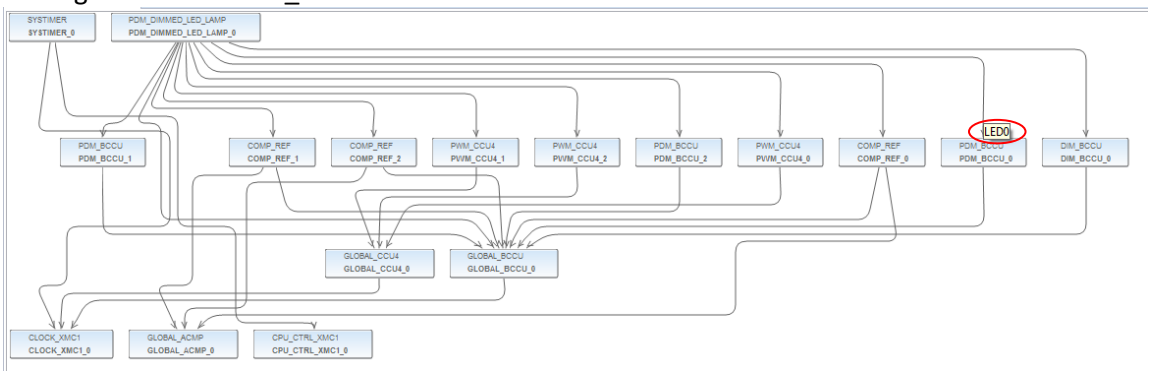




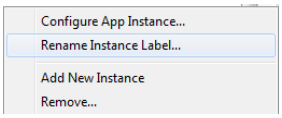


3. Rename the instance labels for PDM_BCCU APPs.

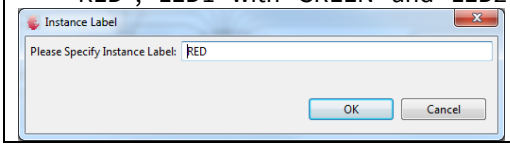
1. Hover your mouse cursor over the connecting arrow to a PDM_BCCU APP. A label will appear momentarily e.g. LED0.
2. Right-click the PDM_BCCU APP.



3. Select “Rename Instance Label”.

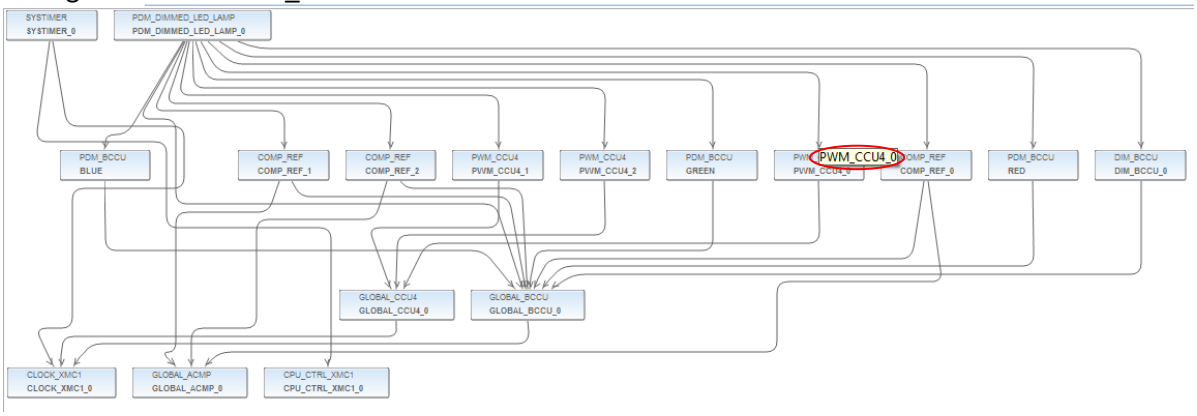


4. Type in new instance label. Repeat steps 1 to 4 for other PDM_BCCU APP instances. Replace “LED0” with “RED”, “LED1” with “GREEN” and “LED2” with “BLUE”.

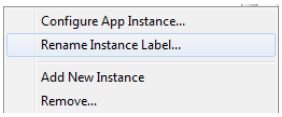


4. Rename the instance labels for PWM_CCU4 APPs.

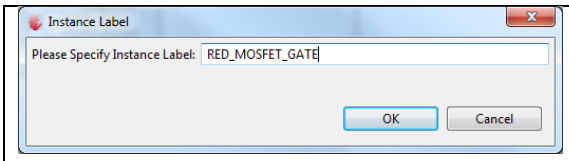
5. Hover your mouse cursor over the connecting arrow to a PWM_CCU4 APP. A label will appear momentarily e.g. PWM_CCU4_0.
6. Right-click the PWM_CCU4 APP.



7. Select “Rename Instance Label”.

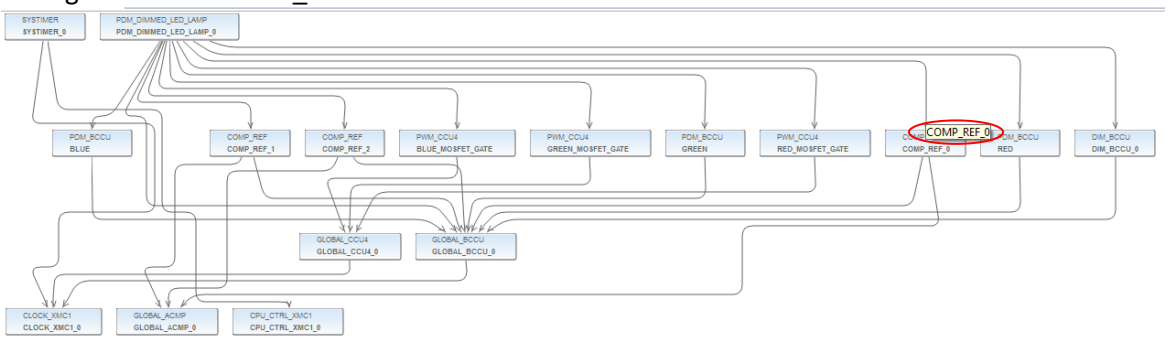


8. Type in new instance label. Repeat steps 1 to 4 for other PDM_BCCU APP instances. Replace “PWM_CCU4_0” with “RED_MOSFET_GATE”, “PWM_CCU4_1” with “GREEN_MOSFET_GATE” and “PWM_CCU4_2” with “BLUE_MOSFET_GATE”.

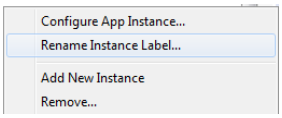


5. Rename the instance labels for COMP_REF APPs.

9. Hover your mouse cursor over the connecting arrow to a COMP_REF APP. A label will appear momentarily e.g. COMP_REF_0.
10. Right-click the COMP_REF APP.



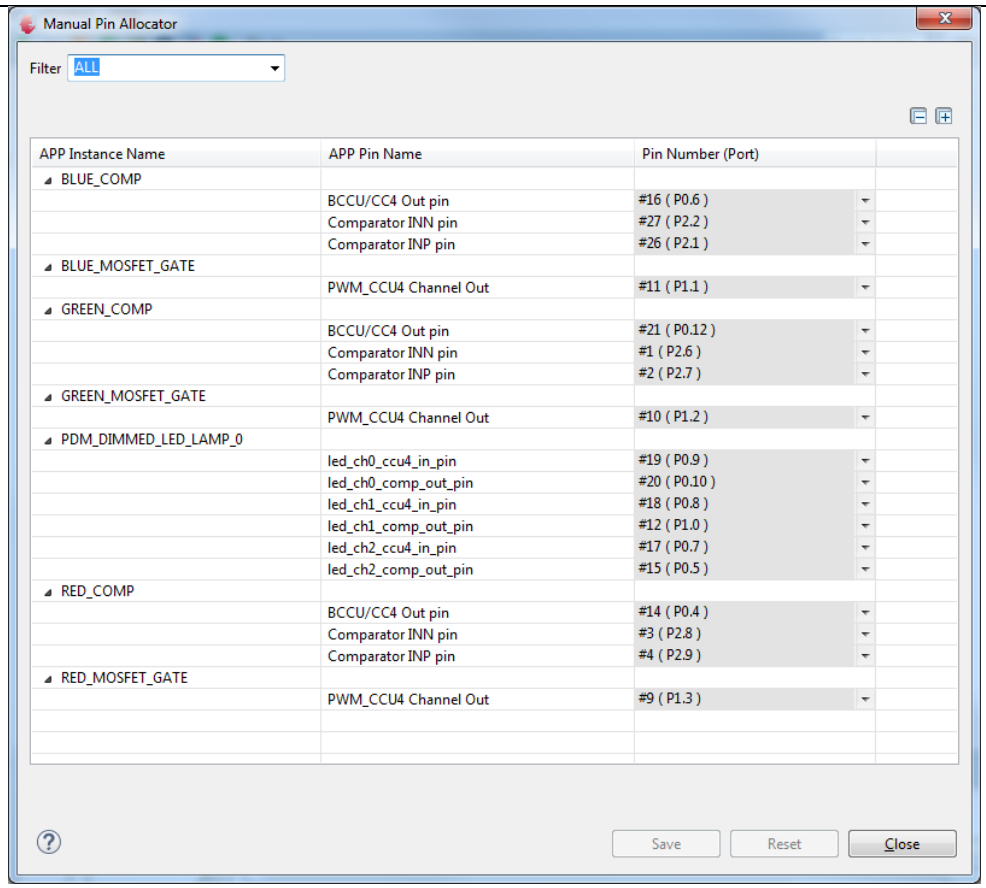
11. Select “Rename Instance Label”.



12. Type in new instance label. Repeat steps 1 to 4 for other PDM_BCCU APP instances. Replace “COMP_REF _0” with “RED_COMP”, “COMP_REF_1” with “GREEN_COMP” and “COMP_REF_2” with “BLUE_COMP”.



6. Use the  "Manual Pin Allocator" found in the toolbar, configure the microcontroller pins used. “PWM_CCU4 Channel Out” refers to the pin used to drive the MOSFET gate, “BCCU/CCU4 Out pin” refers to the pseudo-DAC output for generating a reference level to the analog comparator, “Comparator INN/INP pin” refers to the analog comparator inputs, “led_chx_ccu4_in_pin” refers to the input pin to the CCU4 and “led_ch0_comp_out_pin” refers to the analog comparator output pin.



7. Generate the code for configurations made using  shortcut in the toolbar.
8. Change main.c accordingly.
    a. Create periodic software timer using SYSTIMER API.
    b. Define interrupt handler for software timer i.e. change LED color.
9. Build and download to the microcontroller using  shortcut in the toolbar.

HOW TO TEST:

Download and run the demo in the uC.

OBSERVATIONS:

- Lamp color slowly changes to yellow
- Lamp color slowly changes to magent
- Lamp color slowly changes to cyan
- Sequence repeats itself.

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

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