EXAMPLE NAME: LED_MATRIX_EXAMPLE_XMC12

OVERVIEW: This example demonstrates how use the LED_MATRIX APP to drive 2 units of 5-by-7 (column by row) LED matrix display, where the display characters are changed in the callback function.

DESCRIPTION:

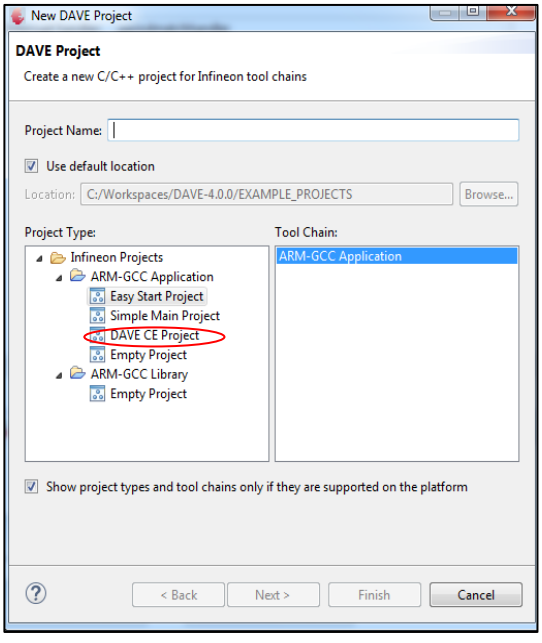
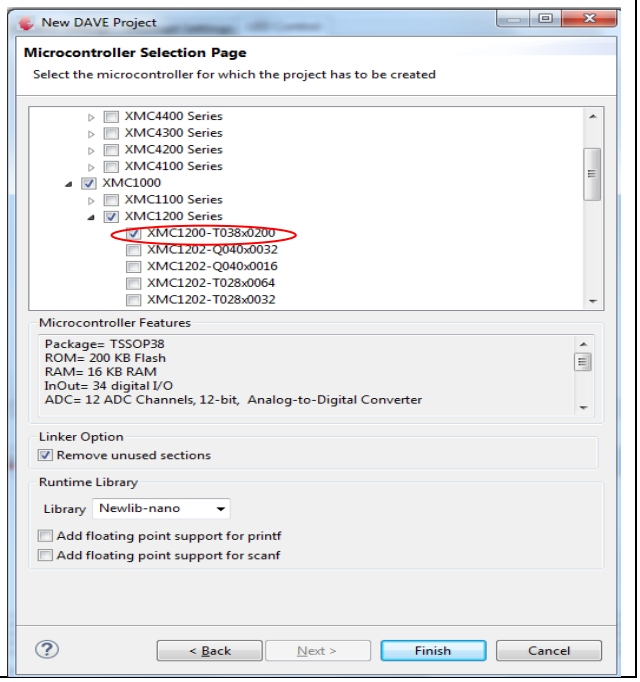
- LED_MATRIX APP is configured with 5 columns and the callback function is defined where the display is toggled.

REQUIRMENTS:

Boards Required: XMC1200 CPU Board (Order Nr: KIT_XMC12_BOOT_001), 5-by-7 LED Matrix Display Card (Prototype board, please refer to attached schematics "InTouch_LED5x7.pdf")

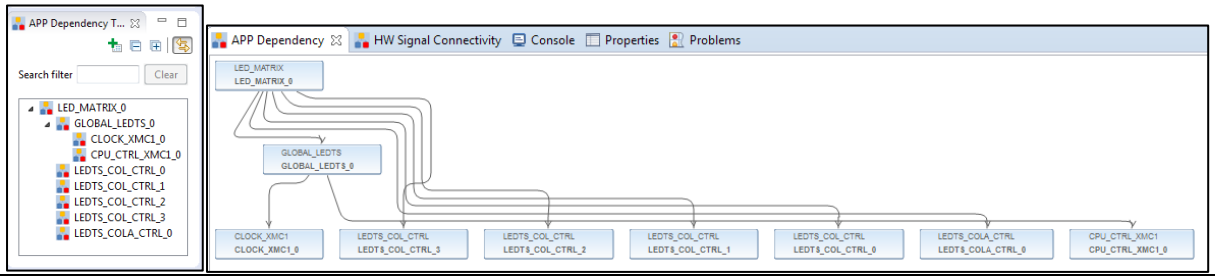
HOW TO CREATE THE PROJECT:

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

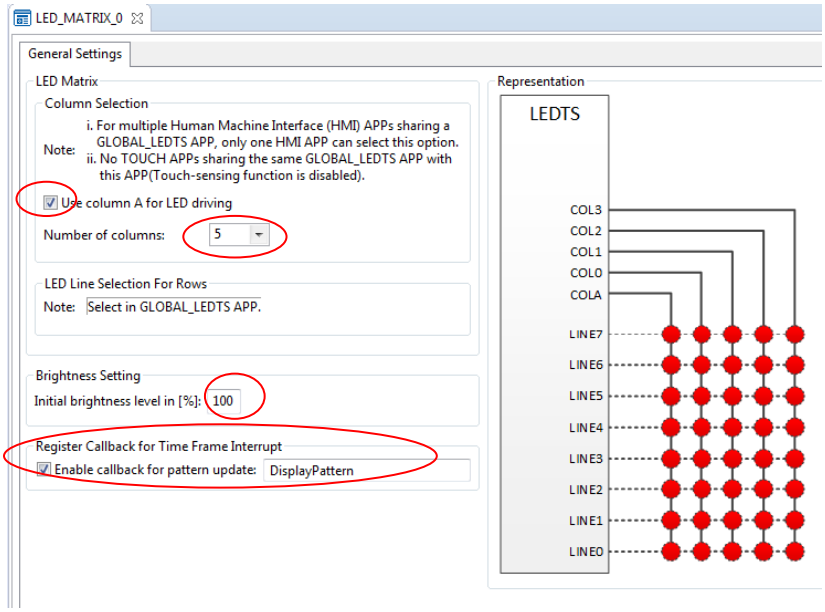
Enter Project Name Select "Project Type ➔ DAVE CE Project"	Select Microcontroller ➔XMC1200 Series ➔ XMC1200-T038x0200
	

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

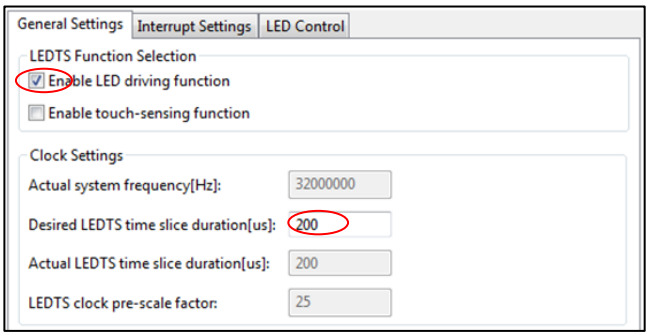
Views: App Dependency Tree and App Dependency

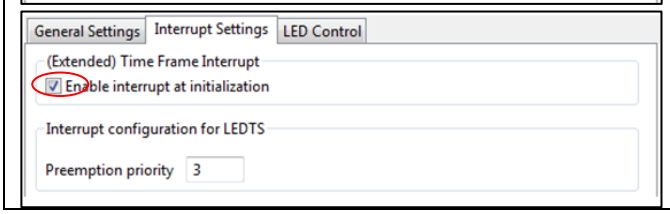


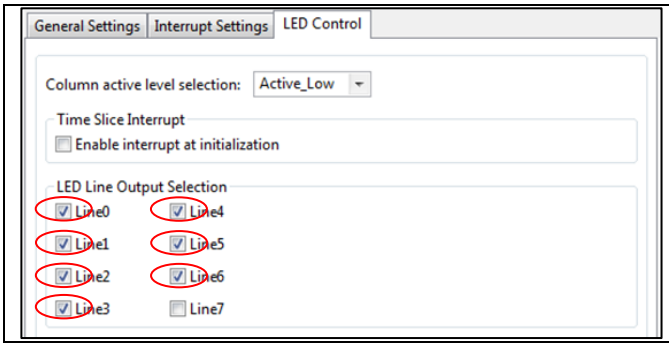
LED_MATRIX_0:



GLOBAL_LEDTS_0:

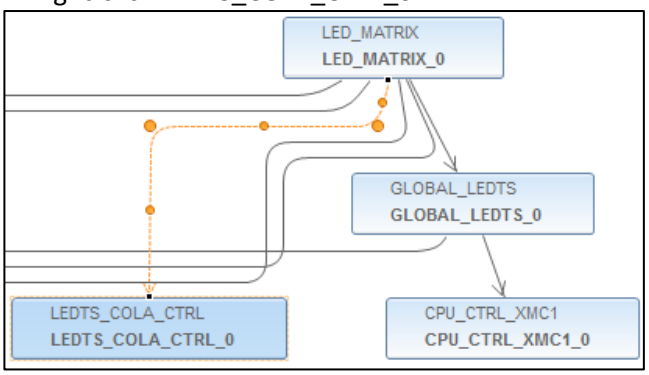




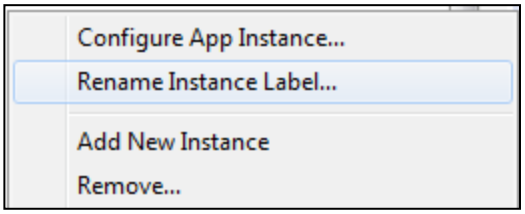


3. Rename the APP instance label: LEDTS_COLA_CTRL →COLUMN1.

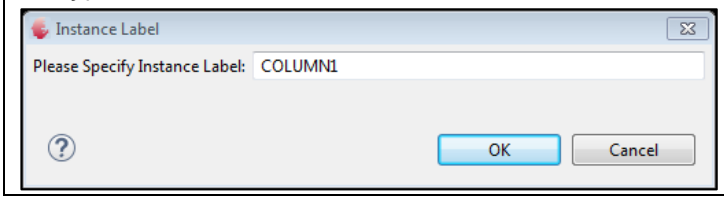
1. Right-click LEDTS_COLA_CTRL_0.



2. Select "Rename Instance Label".



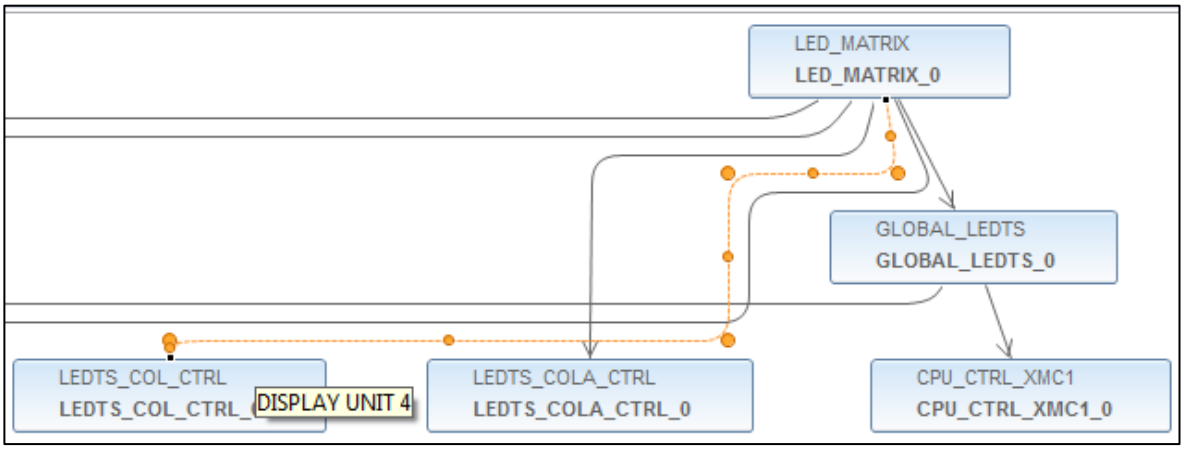
3. Type in new instance label.



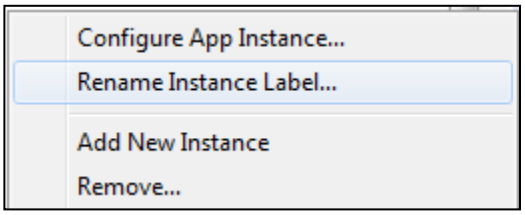
4. Rename the instance labels for LEDTS_COL_CTRL APPs.

1. Hover mouse cursor over the connecting arrow to an LEDTS_COL_CTRL APP. A label will display momentarily e.g. DISPLAY UNIT 4.

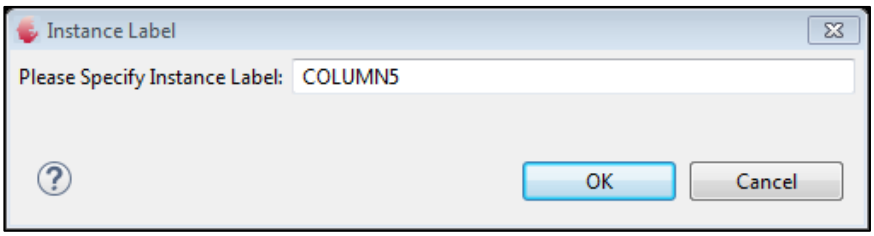
2. Right-click the LEDTS_COL_CTRL APP.



3. Select "Rename Instance Label".

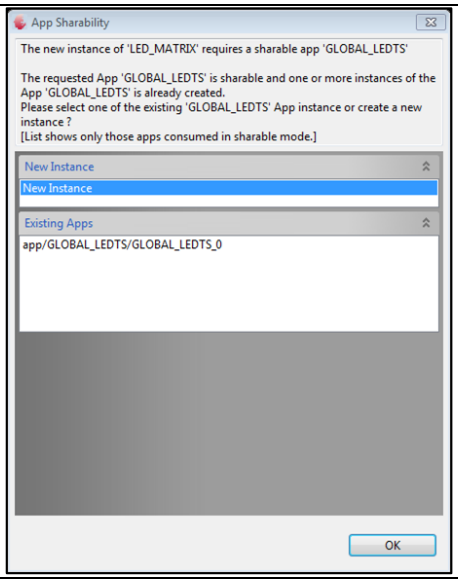


4. Type in new instance label.

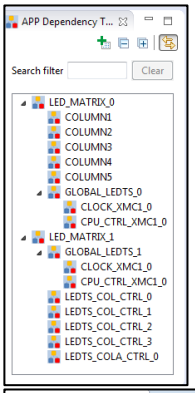


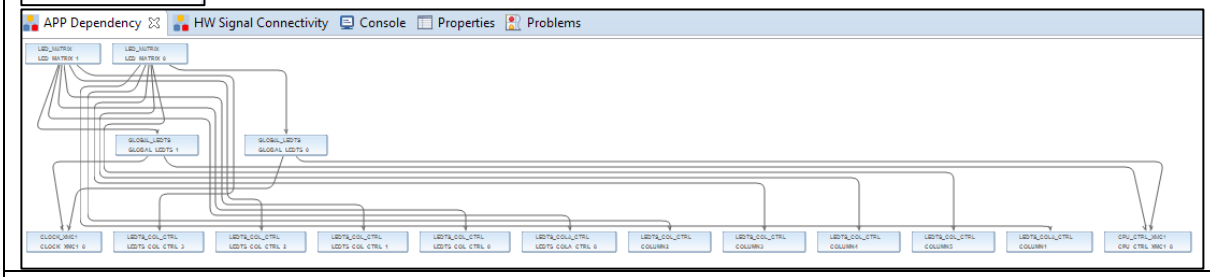
5. Repeat steps 1 to 4 for other LEDTS_COL_CTRL APPs. Re-label the instances as follows: "DISPLAY_UNIT1->COLUMN2", "DISPLAY_UNIT2->COLUMN3", "DISPLAY_UNIT3->COLUMN4" and "DISPLAY_UNIT4->COLUMN5".

5. Use the "Add New App" in the toolbar to add another instance of LED_MATRIX APP. Select "New Instance" for GLOBAL_LEDTS APP. Then, configure the App instances with the following configurations.

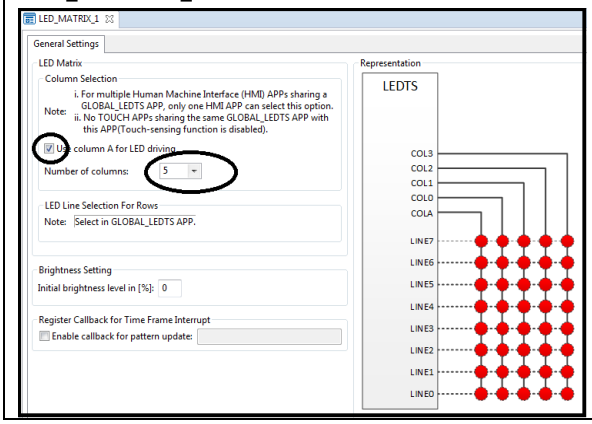


Views: App Dependency Tree and App Dependency

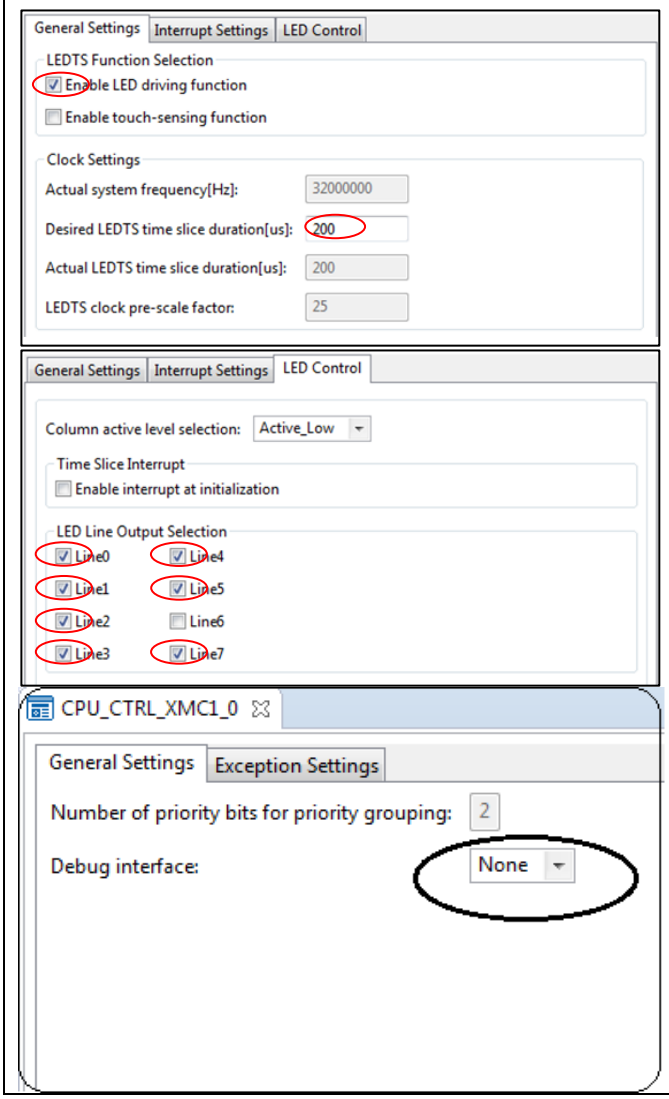




LED_MATRIX_1:



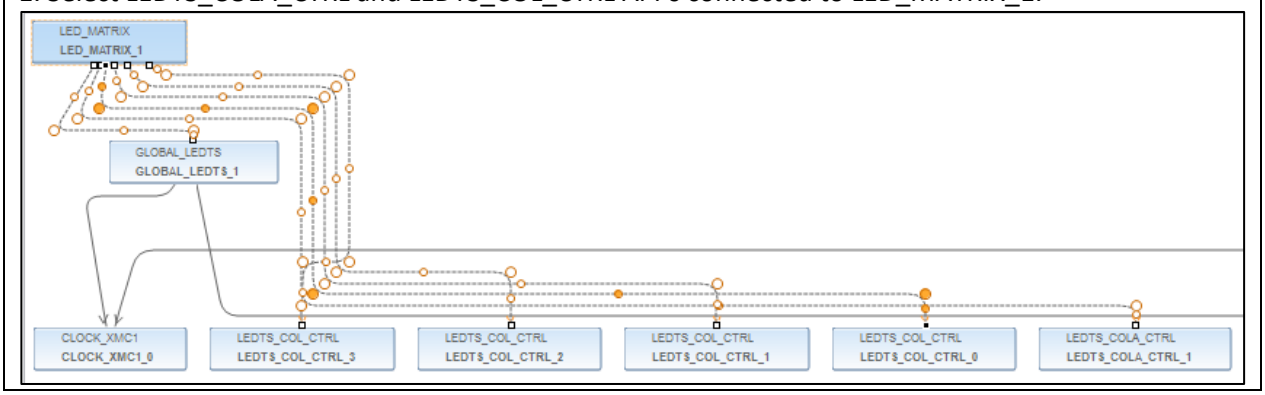
GLOBAL_LEDTS_1:



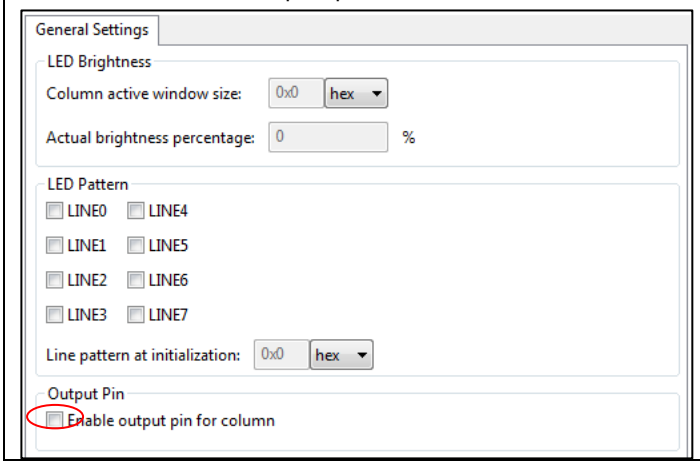
In CPU_CTRL_XMC1 APP, change the debug interface to **None**. Otherwise **Line 7** and **Line 6** can't be enabled in GLOBAL_LEDTS_1, as those pins will be reserved for Debug interface.

6. Disable column output pins for LEDTS_COLA_CTRL and LEDTS_COL_CTRL APPs that are connected to LED_MATRIX_1 APP.

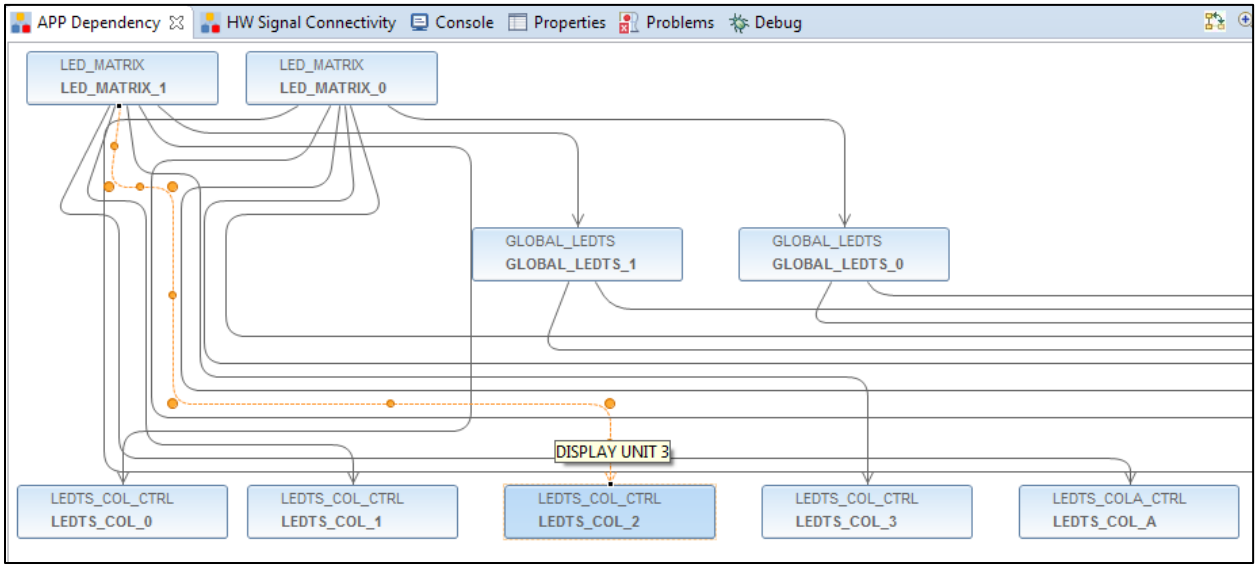
1. Select LEDTS_COLA_CTRL and LEDTS_COL_CTRL APPs connected to LED_MATRIX_1.



2. Disable column output pin.



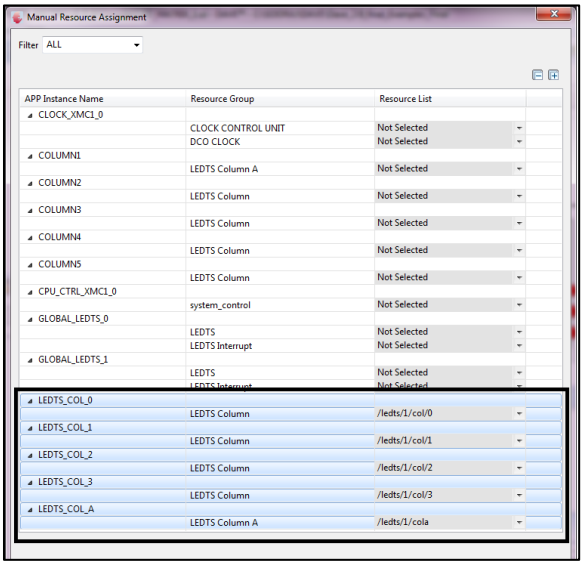
7. Rename each APP instance Labels as we did in step 3 and step 4.
    a. Display_Unit_0 -> LEDTS_COL_A
    b. Display_Unit_1 -> LEDTS_COL_0
    c. Display_Unit_2 -> LEDTS_COL_1
    d. Display_Unit_3 -> LEDTS_COL_2
    e. Display_Unit_4 -> LEDTS_COL_3



8. Perform the Hardware Resource Assignments for the above said columns :
    a. LEDTS_COL_A -> /ledts/1/col/a
    b. LEDTS_COL_0 -> /ledts/1/col/0
    c. LEDTS_COL_1 -> /ledts/1/col/1

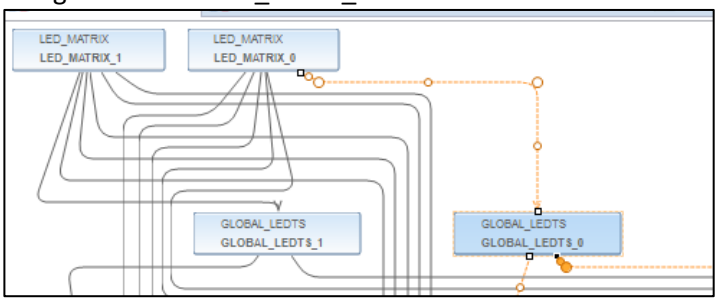
d. LEDTS_COL_2 -> /ledts/1/col/2

e. LEDTS_COL_3 -> /ledts/1/col/3

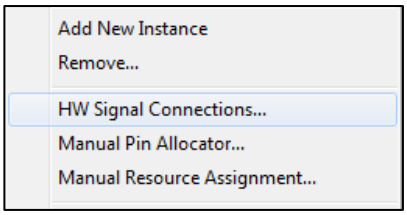


9. Connect signal from GLOBAL_LEDTS_0 to GLOBAL_LEDTS_1 to synchronize their clocks.

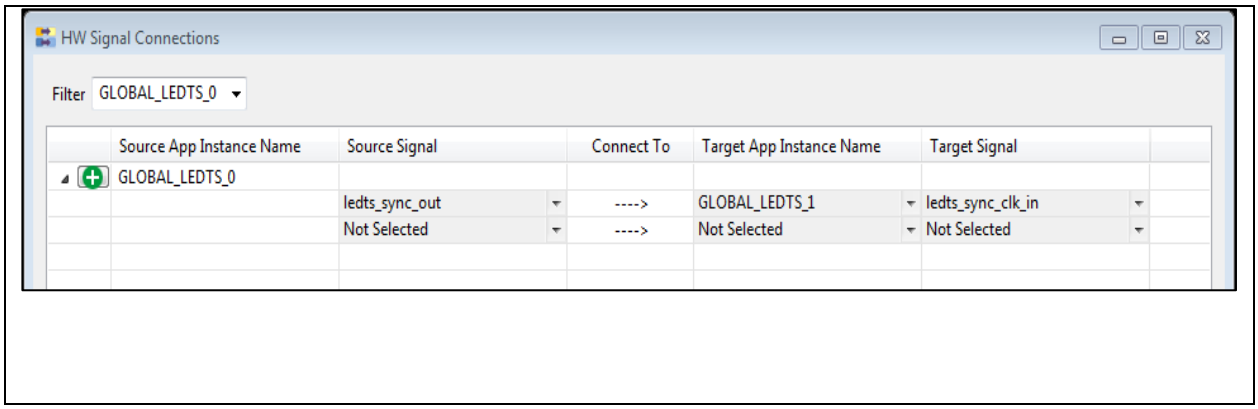
1. Right-click GLOBAL_LEDTS_0.



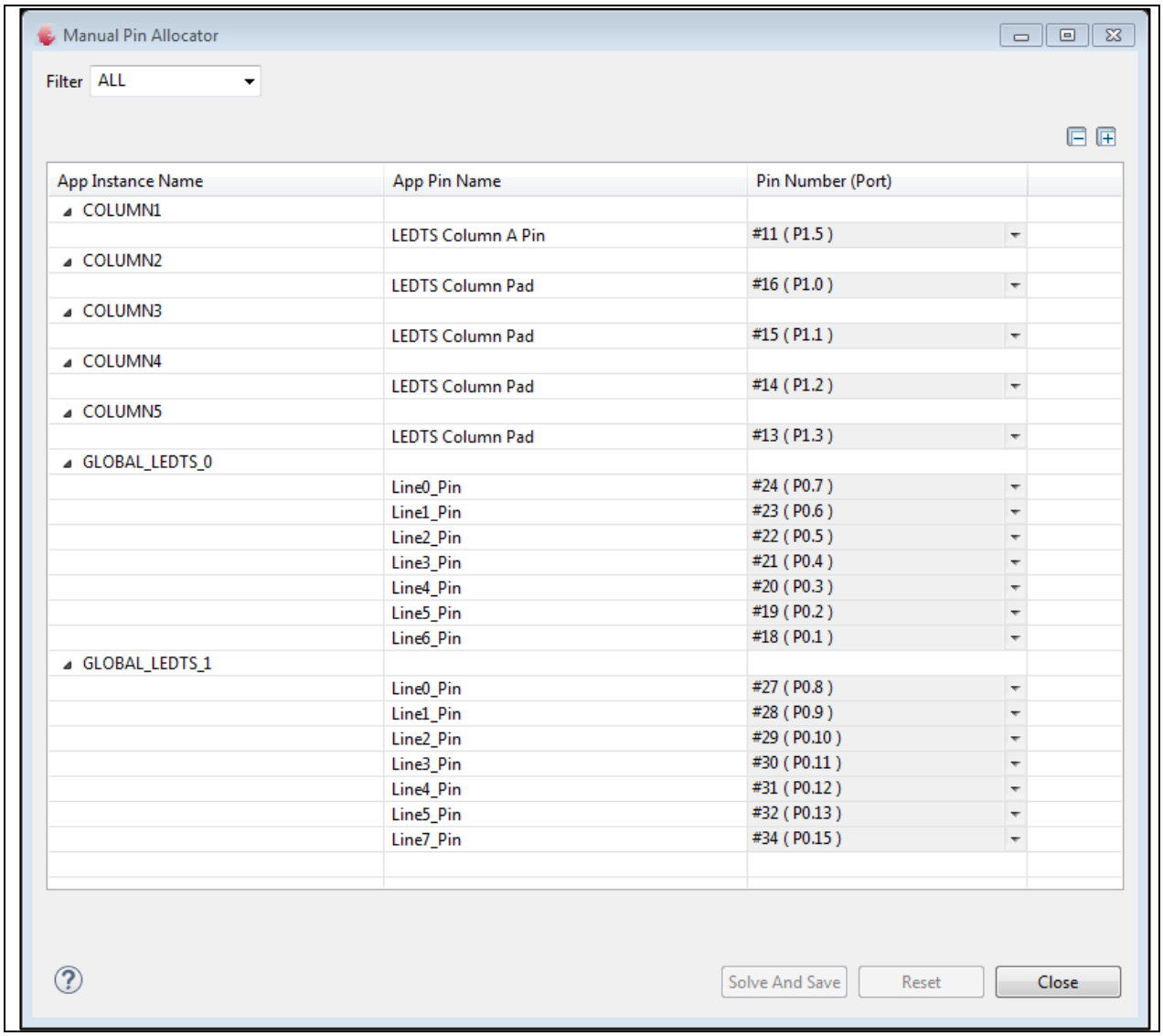
2. Select "HW Signal Connections".



3. Connect "ledts_sync_out" to "ledts_sync_clk_in" of GLOBAL_LEDTS_1.



10. Use the  "Manual Pin Assignment" found in the toolbar, configure the output pins for the LED Matrix.



11. Generate the code for configurations made using  shortcut in the toolbar.
12. Change main.c accordingly.
13. Build and download to the microcontroller using  shortcut in the toolbar.

HOW TO TEST:

Download and run the demo in the uC.

OBSERVATIONS:

- LED Matrix 0 will toggle its display between the characters "A" and "a" every second.
- LED Matrix 1 will toggle its display between the characters "B" and "b" every second.

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

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