

PAC[®] OpenOCD-Eclipse Usage

Power Application Controller[®]



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1 INTRODUCTION

This document explains how to use OpenOCD along with Eclipse for PAC[®] devices. Note that OpenOCD, Eclipse, and plugins are all open source, so additional documentation can be found on the internet and supported by the community.

OpenOCD has been tested with debuggers supporting the CMSIS-DAP protocol and ST-Link. For the SWDAP and DAPLINK hardware modules, it is necessary to modify the SWDIO and SWCLK series resistors from 470R to 33R.

The rest of this document assumes that “Eclipse with PAC Support” has been installed. It also assumes that the document “PAC Eclipse Usage.pdf”

These instructions are nearly identical for PAC52xx and PAC55xx devices. Where they aren’t identical, it will be noted.

2 OPENOCD/ECLIPSE SETUP AND CONFIGURATION

2.1 Copy OpenOCD files to an appropriate folder

The normal path for this version of OpenOCD is:

C:\Program Files (x86)\GNU MCU Eclipse\OpenOCD\0.10.0-8-20180512-1921

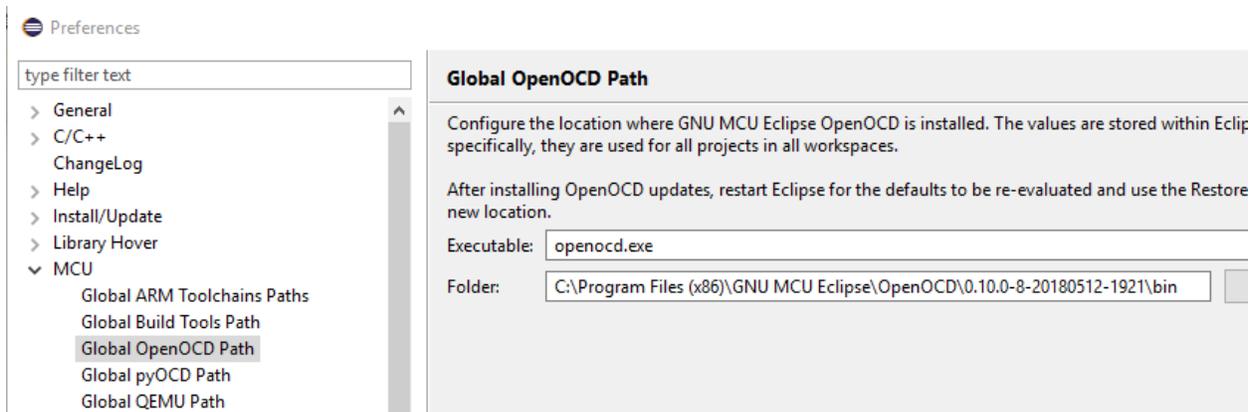
After un-zipping the OpenOCD package with PAC support, copy the folder OpenOCD and all it’s contents to the location below:

C:\Program Files (x86)\GNU MCU Eclipse

2.2 Configure Eclipse

From the Window->Preferences->MCU->Global OpenOCD Path menu, modify the Executable: and Folder: fields with the following path as shown in the figure below:

C:\Program Files (x86)\GNU MCU Eclipse\OpenOCD\0.10.0-8-20180512-1921\bin



Select OK to accept the changes.

2.3 Add .launch files to the Eclipse project

From the .\eclipse_debug_launch_files folder, select .launch files for the desired debugger and either PAC52xx or PAC55xx device. Copy the selected .launch files into each Eclipse project to be debugged.

2.4 Modify .launch files to rename the project name inside

As of 2019-04-17, Eclipse debug and run configurations don't have a means to use a variable for the project name. So, the project_name must be hard coded. As a result, the initial_project_name inside the .launch files must be renamed before they can be used in the project.

An enhancement request has been made at this link: <https://github.com/gnu-mcu-eclipse/eclipse-plugins/issues/342> . To use the launch files, place them under the Eclipse project folder. Then use rename_launch_project_name.bat to rename all the .launch files project name from initial_project_name to the desired_project_name.

The rename_launch_project_name.bat was created to quickly rename the project name within launch files. It uses the fart.exe – “find and replace text” command line app.

Usage:

```
C:\> rename_launch_project_name <current_project_name> <new_project_name>
```

```
Example: C:\eclipse_project\> rename_launch_project_name initial_project_name pac5xxx_project
```

Follow the steps below to rename the project within .launch files.

1. Place the rename_launch_project_name.bat and fart.exe in a folder that's in the PATH.
2. Open a Windows command prompt.
3. Change directory to the Eclipse project folder.
4. Execute the .bat and all .launch files will be modified to the new_project_name.

Example:

```
C:\eclipse_project\> rename_launch_project_name initial_project_name pac5xxx_project
```

2.5 Refresh the Eclipse project

So the .launch files show up in the Eclipse Project Explorer, it's necessary to Refresh the project.

After opening the project in Eclipse, right click on the project and select Refresh.

The .launch files should show up in Project Explorer.

3 USING ECLIPSE/OPENOCD .LAUNCH CONFIGURATIONS

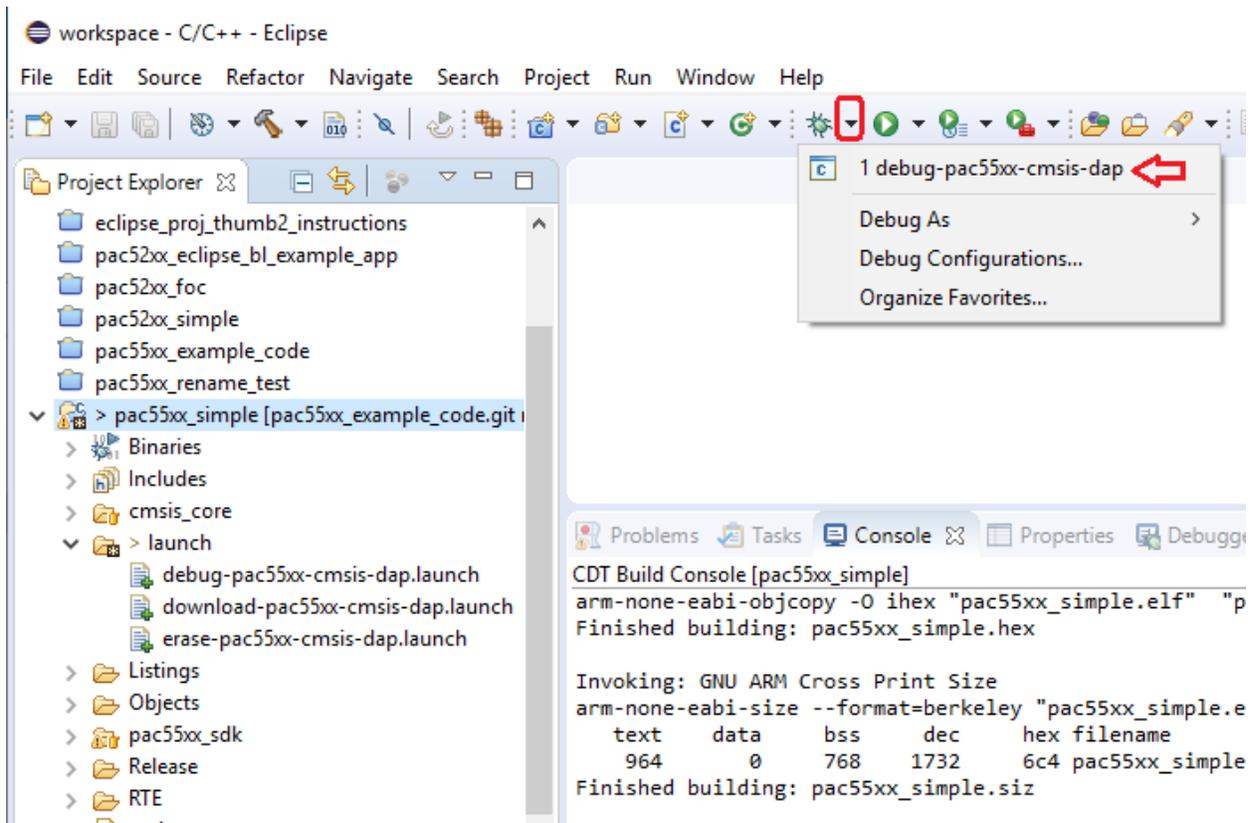
For all debug, download, erase activities, it's best to have only a single project open at a time. Otherwise, the .launch files from multiple projects will be shown in the debug, and run menus.

The following steps will be illustrated for pac55xx and cmsis-dap .launch configurations, but if for example pac52xx or stlink are desired, then simply substitute pac55xx with pac52xx and cmsis-dap with stlink.

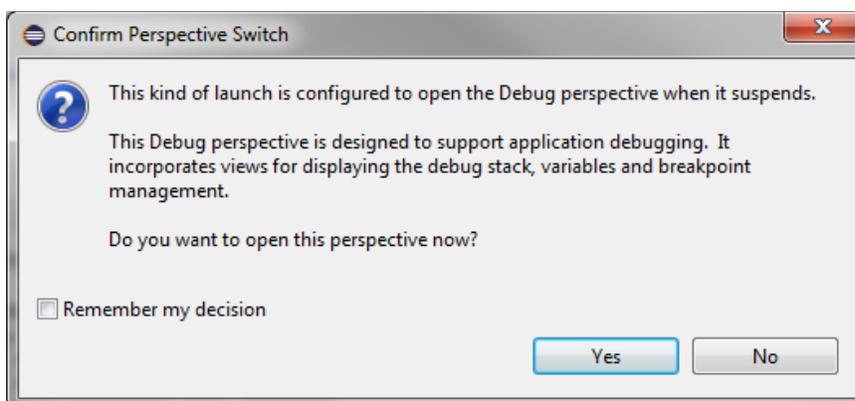
If problems are encountered, check the Troubleshooting Section 3.3

3.1 Starting Debug

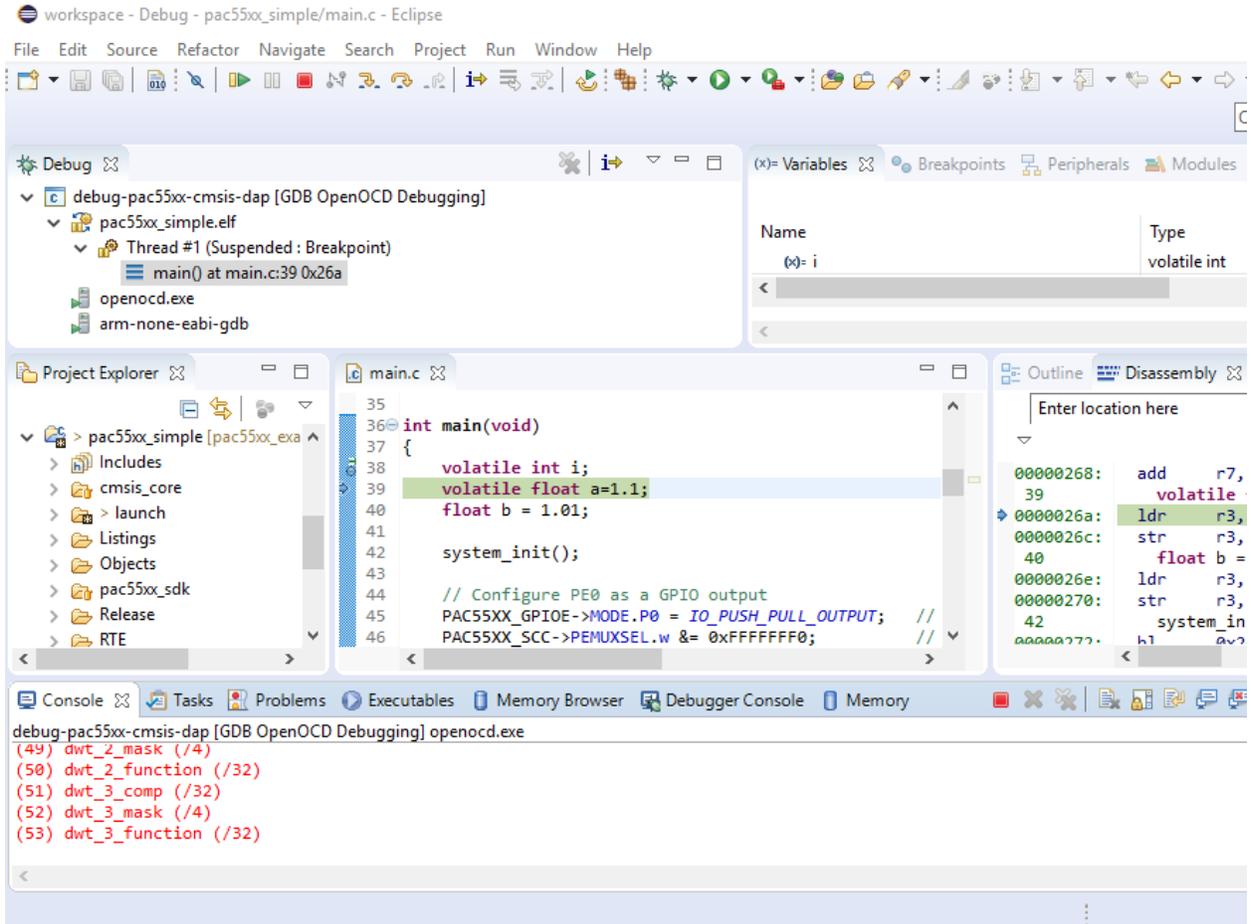
To start a debug session using a new .launch files, click on the down arrow next to the debug icon and then click on “debug-pac55xx-cmsis-dap” to launch the debugger.



The perspective switch message will be shown below which lets you know that you are switching to the debug perspective. Select “Remember my decision” so you won’t be prompted again.



Then, if all goes well, the project will rebuild anything that needs to be rebuilt and start GDB/OpenOCD. The debug session will run to main and stop on the first line of code as shown below. Now you can perform normal debugging operations. If an issue is encountered, check out the Troubleshooting section 3.3 of this document.



The screenshot shows the Eclipse IDE interface during a debug session. The main editor displays the following C code:

```

35
36 int main(void)
37 {
38     volatile int i;
39     volatile float a=1.1;
40     float b = 1.01;
41
42     system_init();
43
44     // Configure PE0 as a GPIO output
45     PAC55XX_GPIOE->MODE.P0 = IO_PUSH_PULL_OUTPUT; //
46     PAC55XX_SCC->PEMUXSEL.w &= 0xFFFFFFFF; //
  
```

The console output shows the execution of openocd.exe and the start of the main function:

```

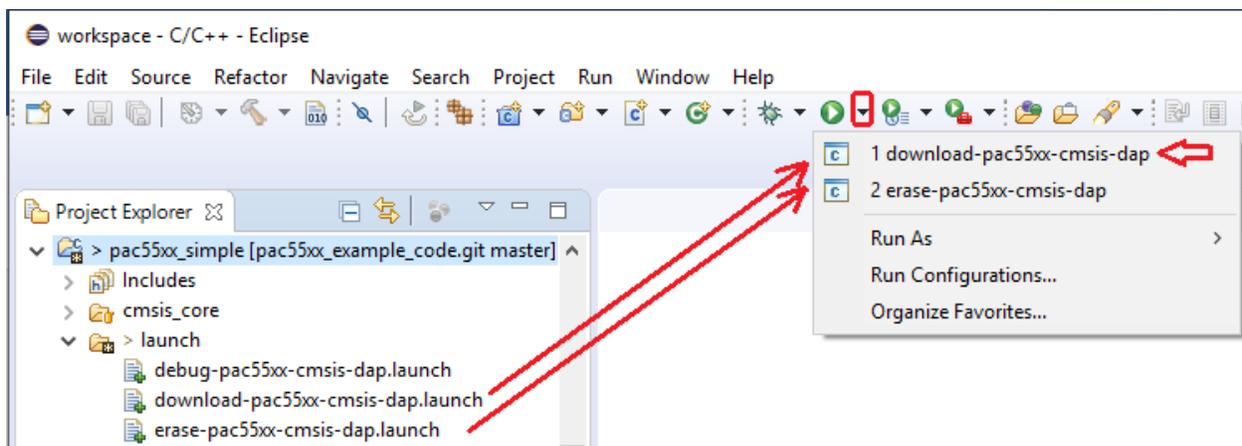
debug-pac55xx-cmsis-dap [GDB OpenOCD Debugging] openocd.exe
(49) dwt_2_mask (/4)
(50) dwt_2_function (/32)
(51) dwt_3_comp (/32)
(52) dwt_3_mask (/4)
(53) dwt_3_function (/32)
  
```

Note that the Debug .launch configurations can be modified via Run->Debug Configurations...

3.2 Erasing and Flashing

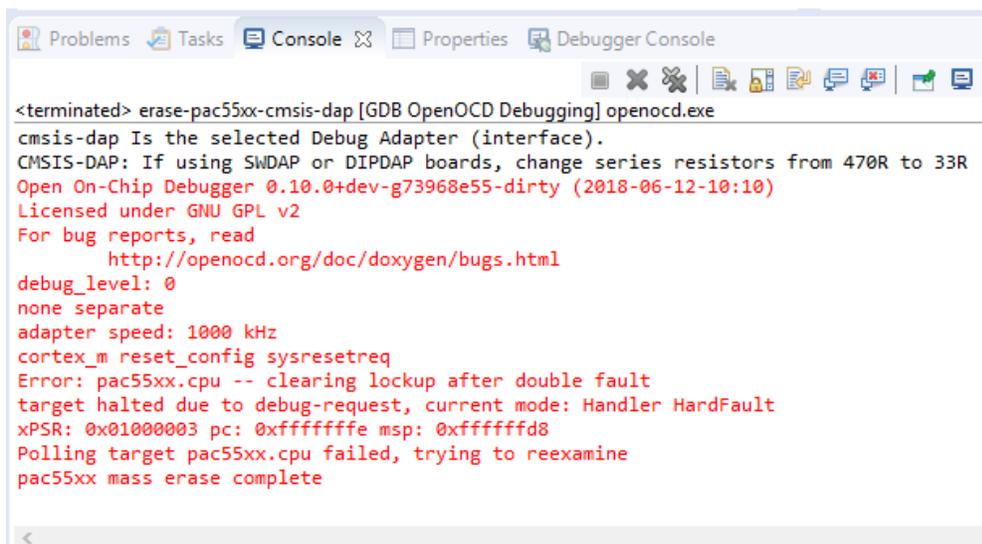
Sometimes it's desirable to Erase the device or Flash it without debugging. For erasing and Flashing there are two .launch configurations that can be used and are found in the Run controls, which can be accessed by clicking the down arrow next to the green Run icon as shown below.

- erase-pac55xx-cmsis-dap.launch
- download-pac55xx-cmsis-dap.launch



3.2.1.1 Erasing

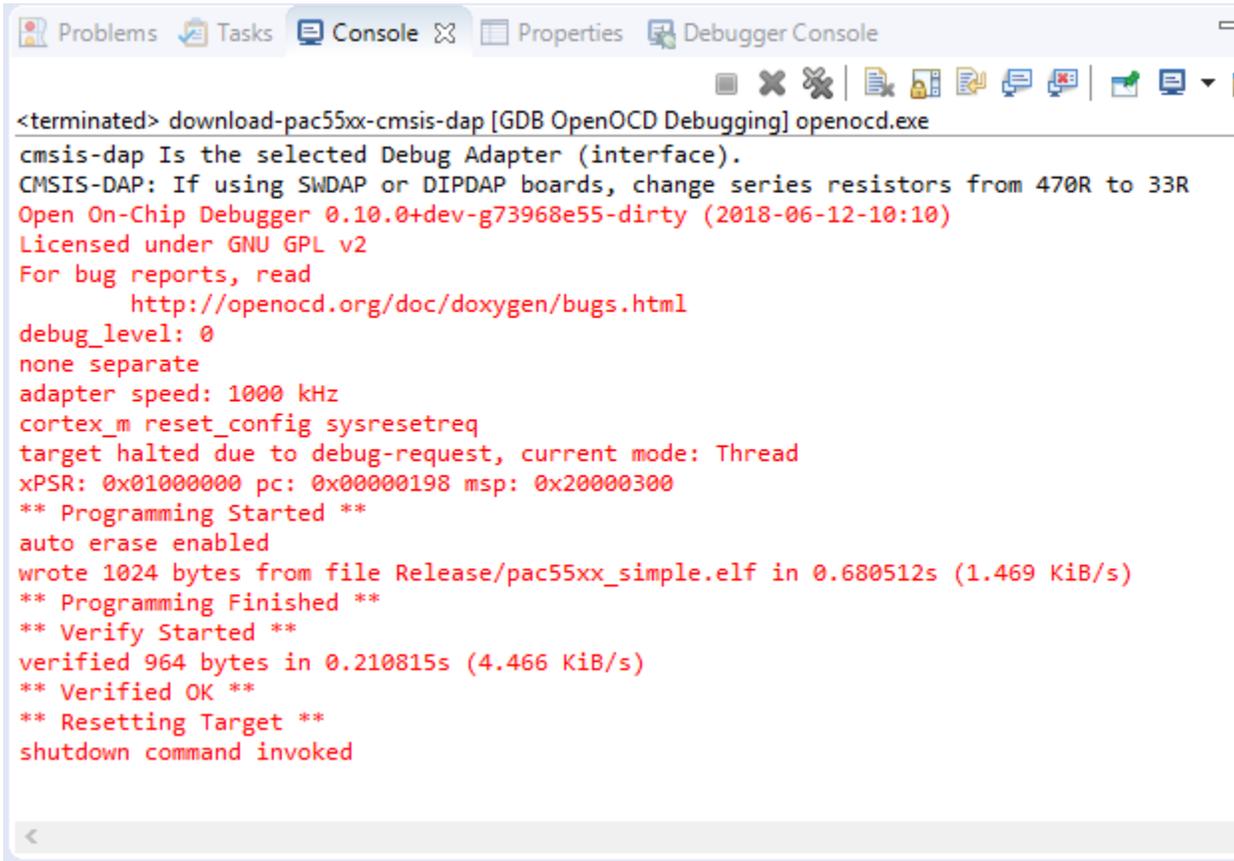
To erase the device, click the down arrow next to the Run icon and then click on "erase-pac55xx-jflash-cmsis-dap". The console will display text as shown below. Sometimes the text in black may appear at the bottom.



3.2.1.2 Downloading (Erase, Program, Verify)

Download will erase, program and verify the device. Click the down arrow next to the Run icon and then click on “download-pac55xx-cmsis-dap”

The console will display a screen similar to below.



```
<terminated> download-pac55xx-cmsis-dap [GDB OpenOCD Debugging] openocd.exe
cmsis-dap Is the selected Debug Adapter (interface).
CMSIS-DAP: If using SWDAP or DIPDAP boards, change series resistors from 470R to 33R
Open On-Chip Debugger 0.10.0+dev-g73968e55-dirty (2018-06-12-10:10)
Licensed under GNU GPL v2
For bug reports, read
    http://openocd.org/doc/doxygen/bugs.html
debug_level: 0
none separate
adapter speed: 1000 kHz
cortex_m reset_config sysresetreq
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000198 msp: 0x20000300
** Programming Started **
auto erase enabled
wrote 1024 bytes from file Release/pac55xx_simple.elf in 0.680512s (1.469 KiB/s)
** Programming Finished **
** Verify Started **
verified 964 bytes in 0.210815s (4.466 KiB/s)
** Verified OK **
** Resetting Target **
shutdown command invoked
```

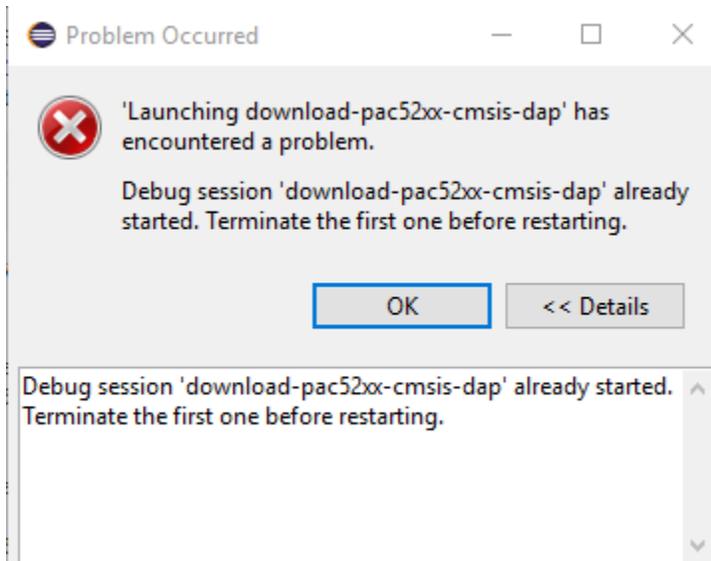
Note that these Run .launch configurations can be modified via Run->Run Configurations...

3.3 Troubleshooting

See also “PAC Eclipse Usage.pdf” Troubleshooting section.

3.3.1 Debug session already started – Terminate the first one before restarting

Sometimes an error may occur as shown below that states “Debug session ... already started. Terminate the first one before restarting. When this happens, close the project, reopen, and try the launch again.



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