



Have examples stopped working under CMSIS6 ?

By Colin Funnell

Don't panic!

Whilst demonstrating how easy it was to get up and running with Keil μ Vision, I was struck by the curse of live demonstrations – it didn't work as expected. With a fresh installation of μ Vision, installing the latest Arm::CMSIS pack and the target MCU Device Family Pack (DFP), I was expecting an easy time.

Copying an example from the Pack Installer and ready to hit Compile All, I was hit with "Unavailable Components". It is something easily fixed for those who have got to grips with pack management, but a little unexpected when new to the game.

It boils down to CMSIS6 being newer than the examples. There are two ways to rectify this, stick with the old or go with the new.

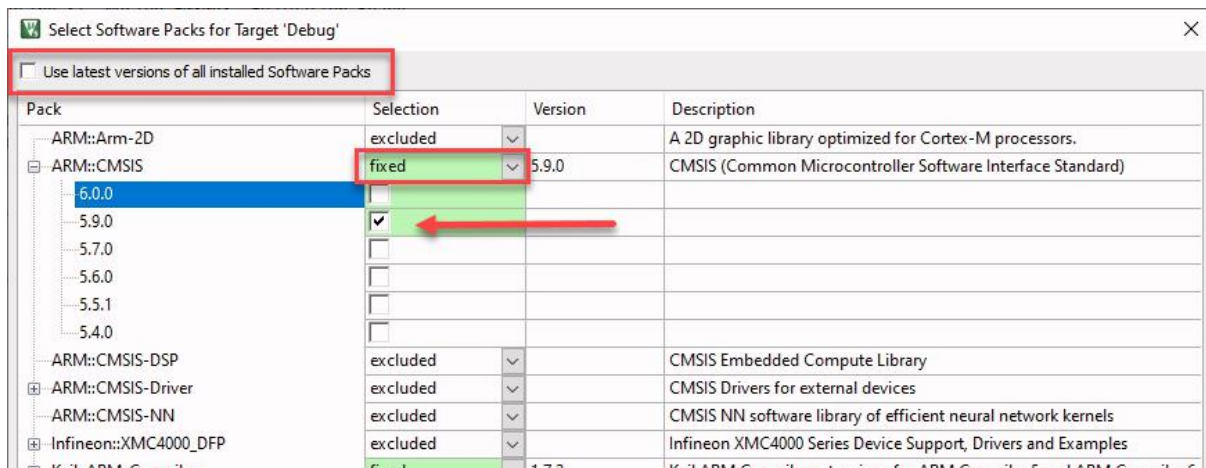
How to fix the immediate issues – Use the older packs

The main problem was that the example project was expecting to use the latest version of packs. It's a sensible thing to have enabled when starting off – so the example isn't stuck in the past and requires continual updates itself. Here, it was trying to use Arm::CMSIS version 6. I would like it to use the latest... of 5.x.

First-off, make sure you have the older pack installed. The pack installer is geared up for prompting the latest of everything but can install older versions. Simply expand out the tree using the '+' icon to see older versions and click install on the relevant version.

Forcing the use of specific pack versions is easily done in the "Select Software Packs" dialogue box. (Filter funnel icon of green diamonds.)

Untick the “Use latest” box at the top and for ARM:CMSIS select “fixed” and from the tree of versions select the latest 5.x.



This clears up the RTOS2 dependency. There is a slight hangover where the CMSIS6 pack calls for a SysTick(API) and it is still asked for when forcing 5.x. Unticking this in the Run Time Environment (RTE) completely removes the option of even asking. It all builds nicely now, as you would expect.

How to fix the immediate issues – Use the new packs

Here we’re going to stick with ‘using the latest’ packs. The select software packs (shown previously) will have the Use Latest box ticked. With the RTE we’ll probably have a number of dependencies to resolve.

From the Pack Installer you might not have noticed there are some familiar looking features but listed differently. These are their new homes outside of the general collection in ARM::CMSIS. Simply click to install ARM::CMSIS-Compiler, ARM::CMSIS-RTX and ARM::CMSIS-View. These are some of the core items starting to be split out from the older CMSIS5 main pack.

The RTE window should be all “green and clean” – it has everything it needs. Hitting compile and ... we still had problems. <sigh>

It turns out there are a few imperfections in the system. In my particular case ‘SVCALL_IRQn’ wasn’t being recognised but after quickly defining it as SVC_IRQn, it found what it was looking for.

So why has it changed?

The Common Microcontroller System Interface Standard (CMSIS) is an evolving collection. Although formulated and structured, what it transports to end users can have their own lifecycle. This release has made a break from the past, and that is why it is CMSIS 6 and not 5.10.

Occasionally it does have to make a step which will upset some builds but all steps are small transitions. Previous packs still exist, some items will become deprecated. Previously deprecated items in the future are then removed. There is always a route back.

This is one of those moments where re-arranging the furniture will upset some people, but hopefully only in minor ways.

This is for the better in the long term. Different aspects have been split-off into other areas for better grouping and it decouples some packs' release schedules. There is a big emphasis on enabling different build flows, opening the door for the likes of DevOps, MLOps and CI/CD-like flows. There are also means to stream data in and out of code running in simulation or real hardware – helping tune your system through automated build and testing.

For those who are happy just to crack-on with their development, the improvements might not be immediately visible, but it does set the scene for the future.

Will it all settle?

CMSIS6 is still relatively new. Silicon vendors and other pack suppliers might have to tweak their packs to bring it in-line with the absolute latest. As an ecosystem, not everyone will have updates to properly support CMSIS6 from day one. They will likely have something in the near future but in the interim, it is always handy to be able to manage the packs you need for your build.

For existing projects, it is always a good idea to make use of the Select Software Packs under Run-time management. Once a project is established, untick the “Use latest versions of all installed Software Packs”. This will fix the project to using the pack versions it was developed with. Pack upgrades can occur but won't be used. From the tree of packs, you can then select the pack version to use at the appropriate stage in your project.

So, the original question of have the examples stopped working under CMSIS6 has a story behind the answer. Technically yes, the old links to the past are being changed. With a few extra steps for now, this shouldn't pose any problems.

A more detailed list of changes made in CMSIS6 can be found in its revision history:

https://arm-software.github.io/CMSIS_6/latest/General/revision_history.html

For more information visit our website: www.hitex.co.uk or get in touch: info@hitex.co.uk.

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