

MPE xARM/Cortex

First steps – Freescale Kinetis FRDM-KL25Z



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Book name

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Software

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First steps – Kinetis FRDM-KL25Z
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Contents

1 Setting up	1
AIDE tools.....	1
AIDE PowerTerm.....	2
What you did.....	3
2 Compiling and testing	4
Compile and download.....	4
Adding application code.....	5

1

Setting up

We assume that you are using a supported board. For the Freescale KL14/15/24/25 devices, this is the Freescale FRDM-KL25Z board. Download and install the OpenSDA software. If a new COM port appears when you connect the board, all is well.

Find the directory containing the MPE control file

FRDMKL25Zsa.ctl

and note it down. It should be in

<xArmCortex>/Cortex/Hardware/KinetisKL20

AIDE tools

AIDE is a program that provides manages external tools and provides a terminal emulator. Make sure that everything is set up correctly.

- Run AIDE
- In AIDE, use
IDE -> Configure Edit/Locate
to set up your favourite editor.
- If the FRDM-KL25Z is not on AIDE's toolbar, add a new tool using:
IDE -> External Tools

To use the MPE control file

FRDMKL25Zsa.ctl

set the start directory to the directory containing FRDMKL25Zsa.ctl. You will need quotation marks if there are spaces in the path. Some people prefer to uninstall and reinstall to a directory with no spaces in the pathname. The set up in my development system is:

BMP file: c:\buildkit.dev\software\Aide\CM01.bmp

Compiler: c:\buildkit.dev\software\compiler\xArmCortexDev.exe

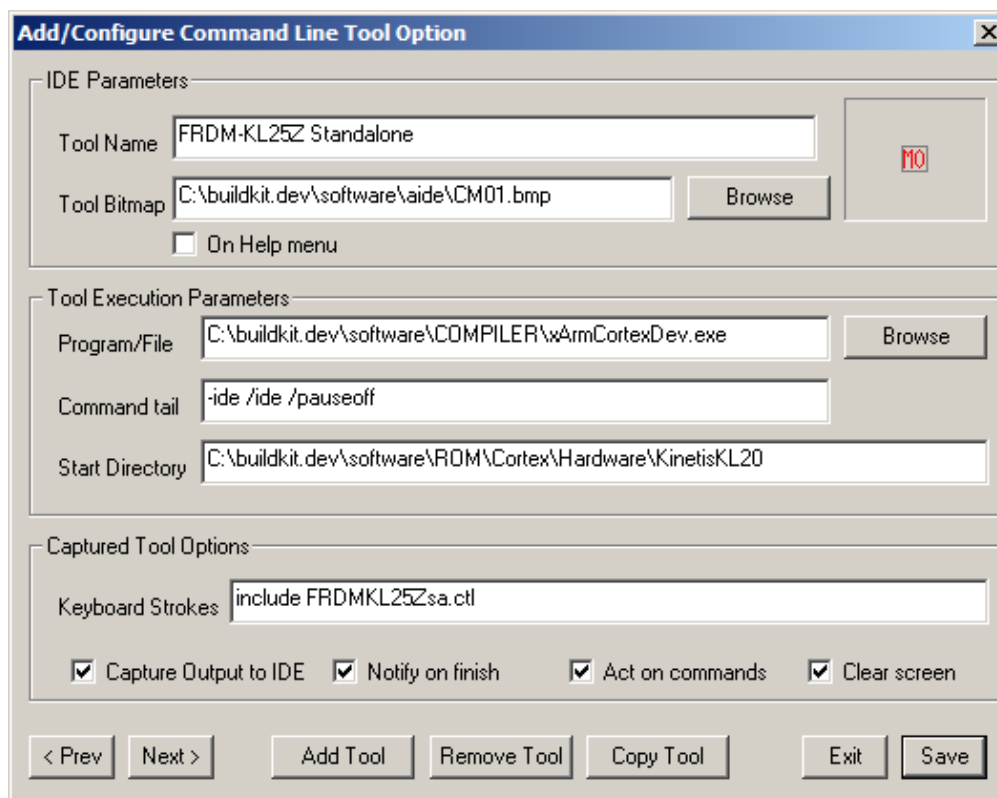
Command tail: -ide /ide /pauseoff

Start dir: C:\buildkit.dev\software\ROM\Cortex\Hardware\KinetisKL20

Keybd Strokes: include FRDMKL25Zsa.ctl

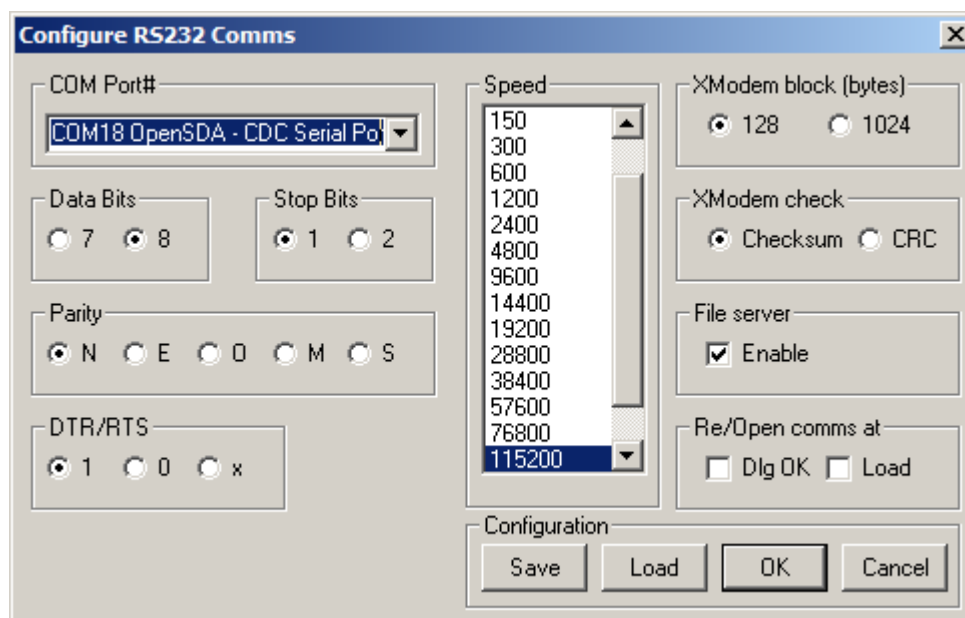
All four checkboxes in the "Captured Tool Options" box are checked. See the following picture for my complete settings. If you are using the Stamp edition of the compiler, change the compiler line:

Compiler: c:\buildkit.dev\software\compiler\xArmCortexStamp.exe



AIDE PowerTerm

Configure PowerTerm for 115200 baud, N81, COMx using the Properties button that is second from the right on the PowerTerm toolbar. Check "Enable File Server" with 128 byte and Checksum XModem selected. Select the OpenSDA port from the drop-down menu.



What you did

You now have the Forth cross compiler tool set up. There will be a corresponding button on the toolbar.

When you click the compiler button the file

`FRDMKL25Zsa.ctf`

is included by the cross-compiler. This file is a control file. It tells the cross compiler how to compile the target and what to compile. Because the tool capture checkboxes were checked when the tool was set up, the compiler runs in the “Tool Capture” window.

2 Compiling and testing

Compile and download

You now have a tool set up. There will be a corresponding button on the toolbar. Edit the control file so that the two lines below are correct for your PC.

```
afterwards fdel F:\FRDMKL25Zsa.bin
afterwards fcopy FRDMKL25Zsa.bin F:\FRDMKL25Zsa.bin
```

When you connected the FRDM-KL25Z board to your PC with a USB cable, an extra drive appeared on your PC. If you copy a binary file to it (with a ".bin" extension), the file is programmed into the target CPU. Make sure that the drive letter in the control file matches that of your board. The two lines delete any previous file and copy the latest one to the board's drive. The **afterwards** directive does this after the compiler has finished.

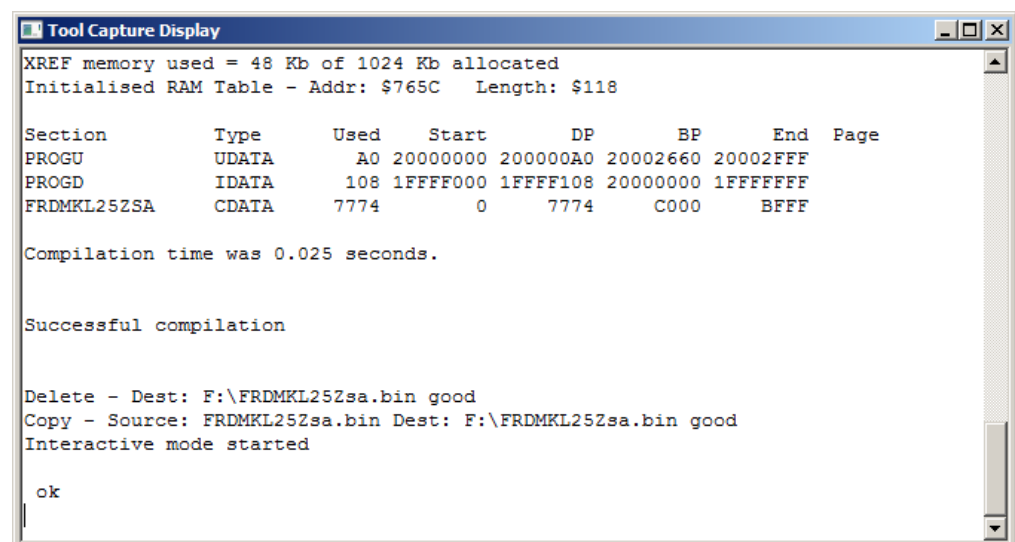
When you click the button, the file

FRDMKL25Zsa.ctl

is included by the cross-compiler. This file is a control file. It tells the cross compiler how to compile the target and what to compile. When the compiler has finished, there will be an output file in your KinetisKL20 folder

FRDMKL25Zsa.bin

The cross compiler always produces binary image files with a ".img" extension unless the control file (as here) tells it to use a different extension, in this case ".bin".



AIDE's Tool Capture window should be visible - the compiler is still alive so that you can disassemble words and use the cross reference tools such as XREF and LOCATE. Make sure that PowerTerm is also visible, but is disconnected.

Once the board is programmed, press the PowerTerm connect button (the telephone) and then reset the board. You should now get the MPE PowerForth sign on message. This is the target Forth on the board. You can use this as a normal Forth, and you can even compile code on it. However, since the cross compiler takes a fraction of a second, and the Forth has facilities to reflash itself, it is quicker just to recompile.

Adding application code

Control files and text macros are important in MPE Forth systems. They are documented in the main cross compiler manual. Please read these sections of the manual.

Although you can just add new lines to the MPE control files, we do not recommend this. You run the risk of losing your changes when you update the compiler. Make your own project. You do this by making a copy of FRDMKL25Zsa.ctl and using it as the basis of your project. MPE suggests that you leave our code alone and make a new project that is **not** in the cross compiler folder.

To do this, make a new folder and put the renamed control file in it, (say) MyFRDMKL25Zsa.ctl. Also copy over FRDMKL25Zsa.no and rename it as (say) myFRDMKL25Zsa .no. Use AIDE's "External Tools" "Copy Tool" button to make a new project button and edit the start directory and include file name.

Edit the control file's text macros that start at line 71 so that they point to the right folders. Edit the build file name on line 357. Now use your new button to recompile and then flash the new image.