User Manual

AxCode::Blocks

ON Semiconductor®

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1. INTRODUCTION

Figure 1 and 2 shows a diagram of the ON Semiconductor Development System Architecture.

Radio Link parameters are set using the AX-RadioLAB GUI. AX-RadioLAB produces source code, compiles it and downloads it into the target board.

AxCode::Blocks is the graphical Integrated Development Environment (IDE) for AX8052 and AXM0F243 projects. It is a customized version of the popular Code::Blocks IDE. It can be used to further customize the AX-RadioLAB generated code, or it can be used to create new projects (such as those that do not involve a radio link).

Both AX-RadioLAB and AxCode::Blocks talk to the ON Semiconductor Symbolic (command line) Debugger (AXSDB) for programming and debugging the AX8052 microcontroller. Normally, Users need not directly interact with AXSDB. AXSDB can however be useful for automated or scripted tasks, thanks to its command line and TCL scripting features.

For AXM0F243 microcontroller, OpenOCD debug interface software is used for programming and debugging using the GDB (GNU) debugger.

The Debug Adapter provides the link between the developer's workstation and the target board.

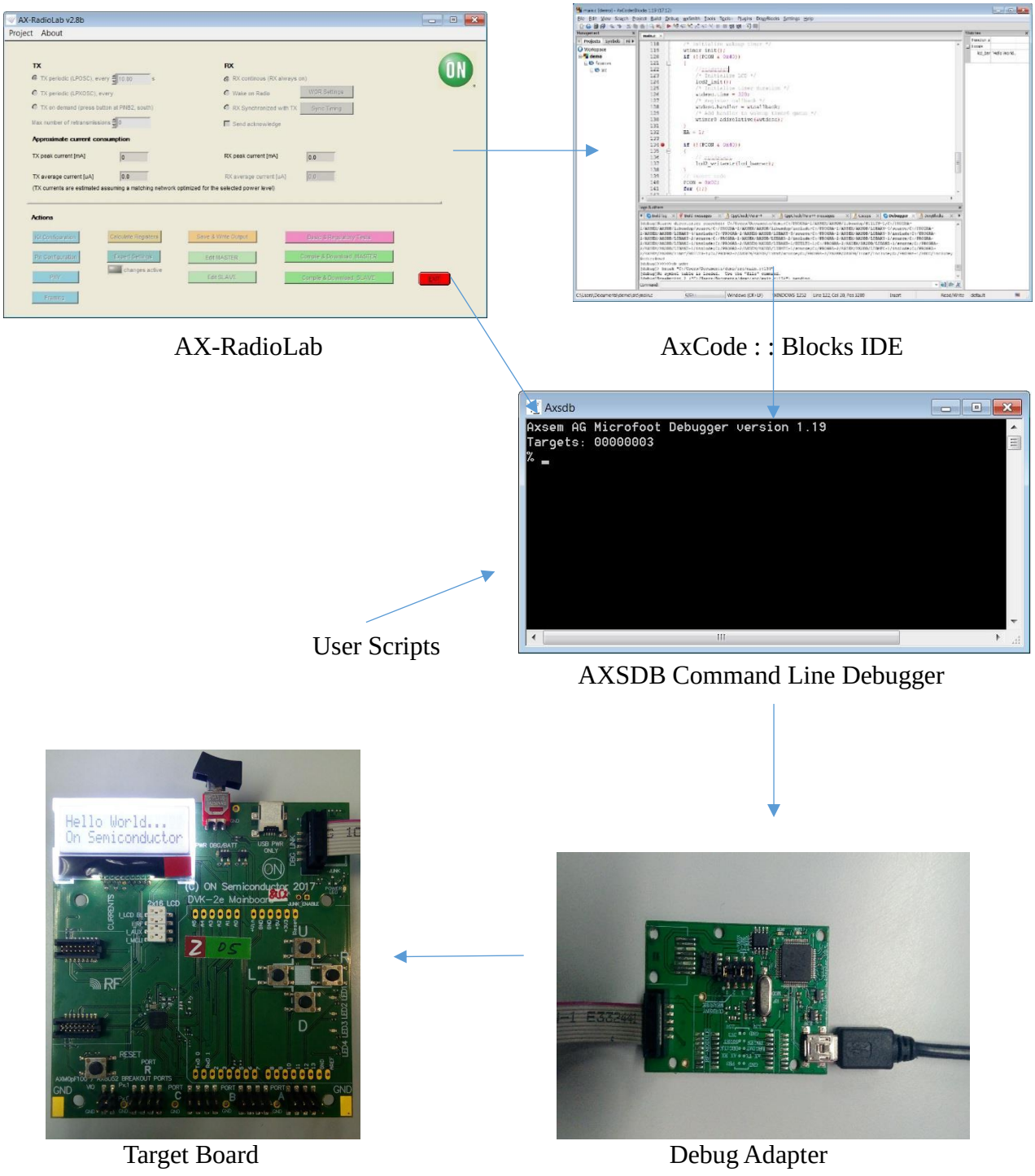


Figure 1: ON Semiconductor Development System Architecture for AX8052

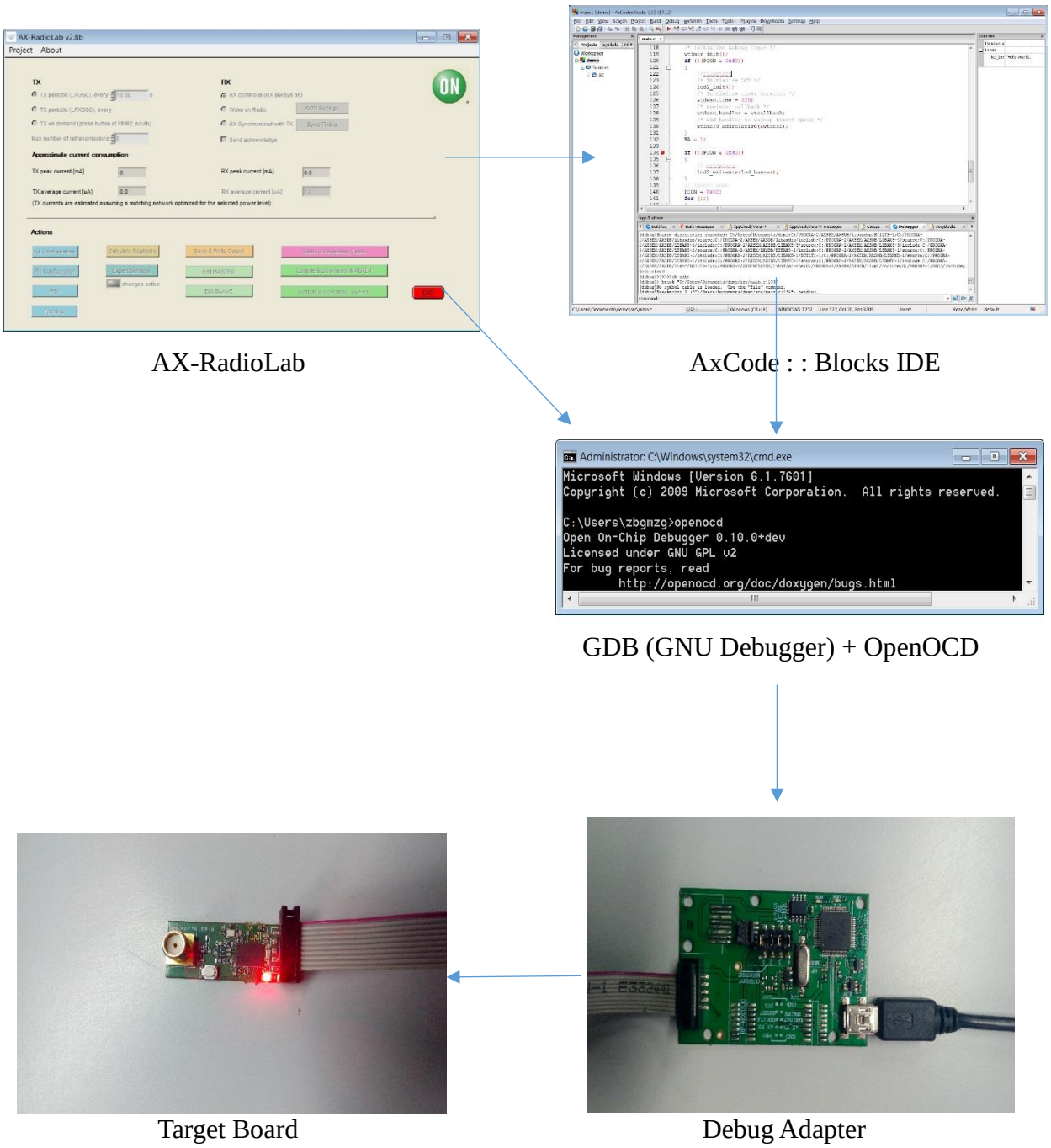


Figure 1: ON Semiconductor Development System Architecture for AXM0F243

This document should guide the reader through the installation of AxCode::Blocks and its use to create, compile and debug a little project.

AX-RadioLAB is documented in a separate document.

For general issues regarding Code::Blocks, please refer to its manual:
http://www.codeblocks.org/docs/manual_en.pdf

2. INSTALLING AXCODE::BLOCKS

The AX-IDE installer contains everything you need: the SDCC compiler, GNU GCC Compiler for ARM, AX-RadioLab, debug adapter drivers, the AXSDB debugger, OpenOCD software, example files and libraries and, of course, AxCode::Blocks.

- Launch the installer.

- After accepting the terms of agreement you are asked to select the components to be installed. We strongly suggest to install all components. Failure to do so could result in missing links in your toolchain.

- Choose where to install AXSDB (it is recommended to keep the default settings). Hit *Install*.

- When asked if you want to install AxCode::Blocks too, click *Yes*: the corresponding setup wizard is started. This one is quite similar to the previous one: go through it.

- Next, you want to install the SDCC compiler and GNU GCC Compiler for ARM. Again, the installation is pretty intuitive. Be sure to tick the option for adding the compiler directory to the system path.

- When asked if you want to install AX-RadioLab, click *Yes* At the end, you will be asked to reboot your computer. This is not necessary.

- Wait until the process finishes and you are done!

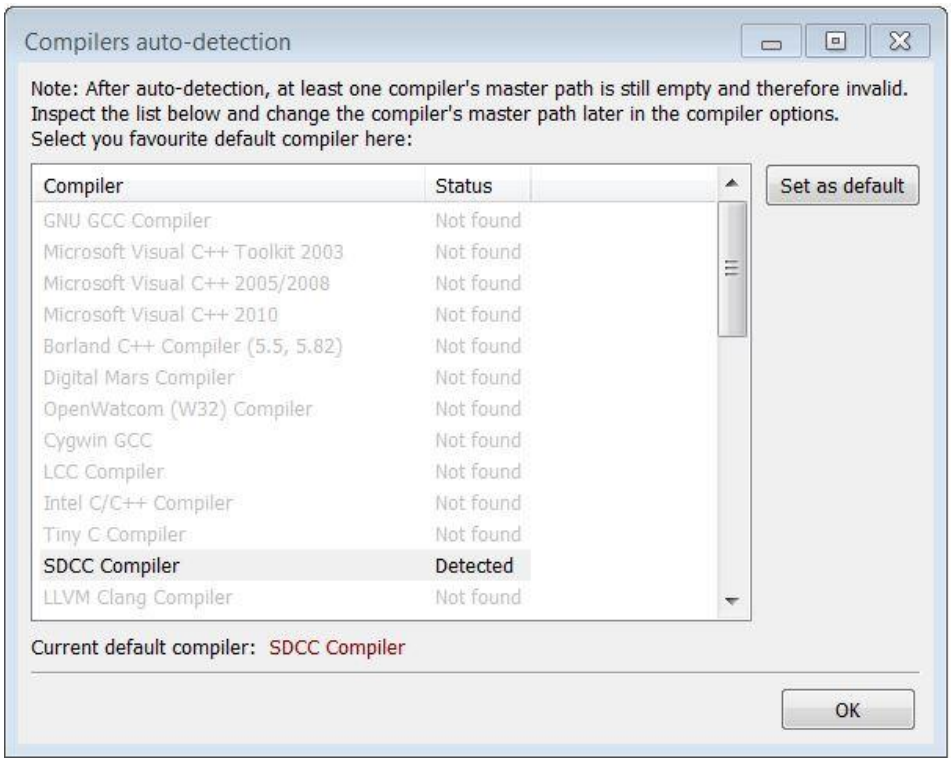
3. CONNECTING THE HARDWARE

Please refer to the application note available from the ON Semiconductor website: http://www.onsemi.com

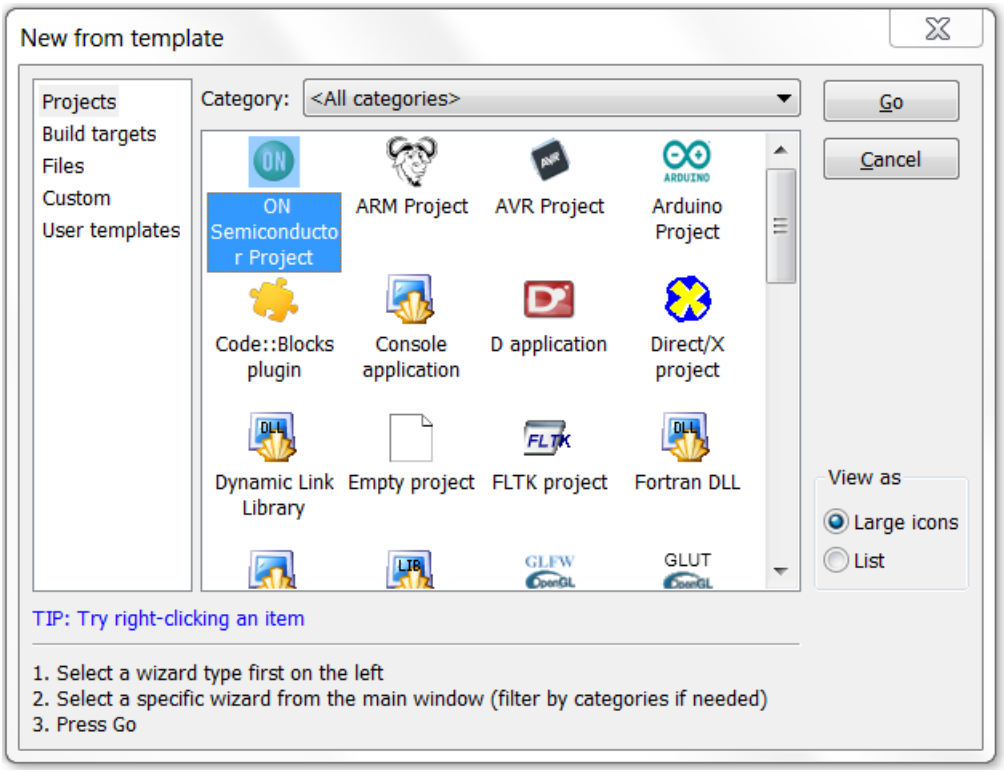
4. Creating a New Project

4.1. AX8052

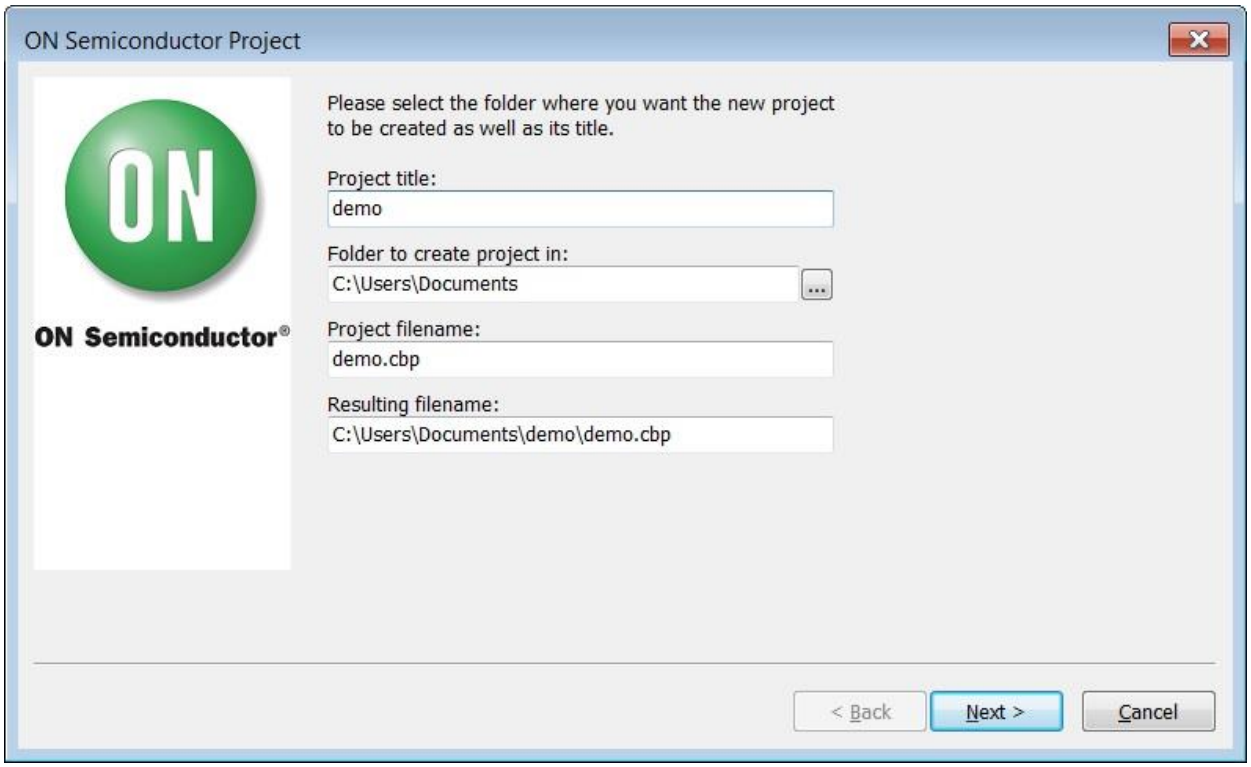
Start AxCode::Blocks. The first time AxCode::Block starts, it scans for installed compilers and presents a list of the compilers found. Select SDCC as default.

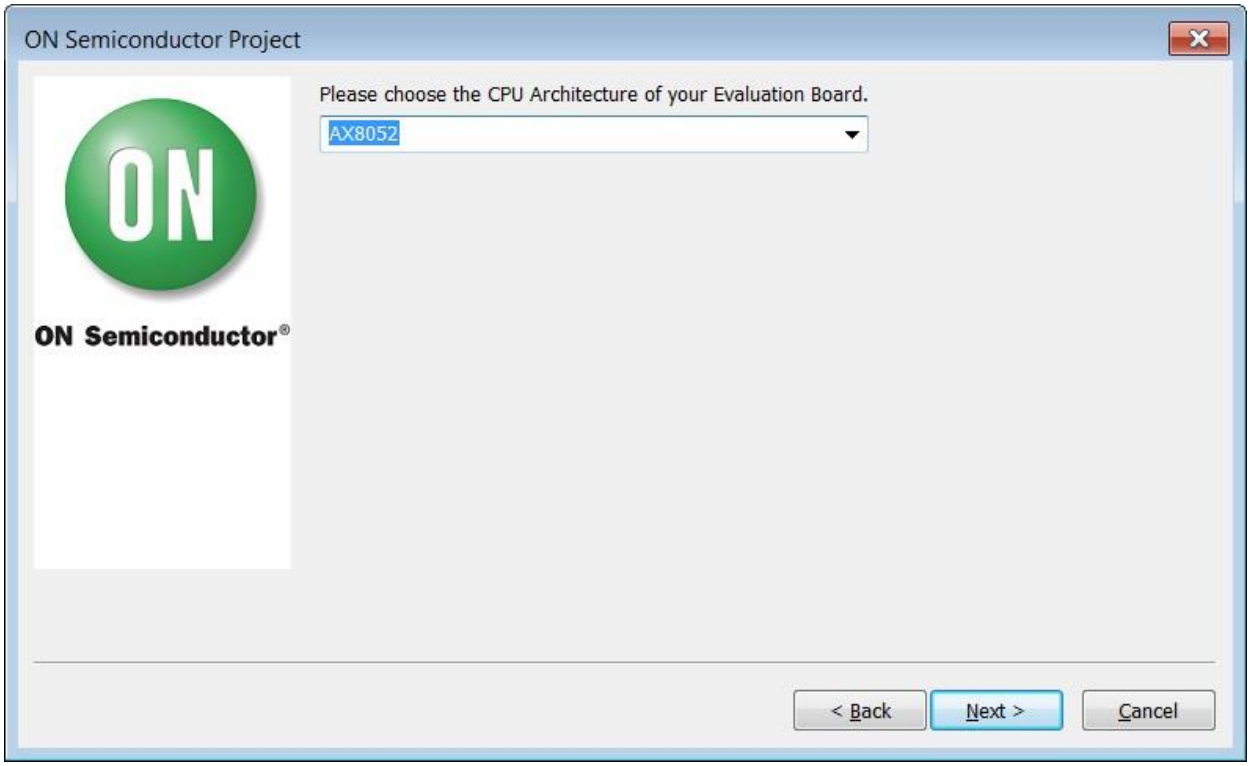


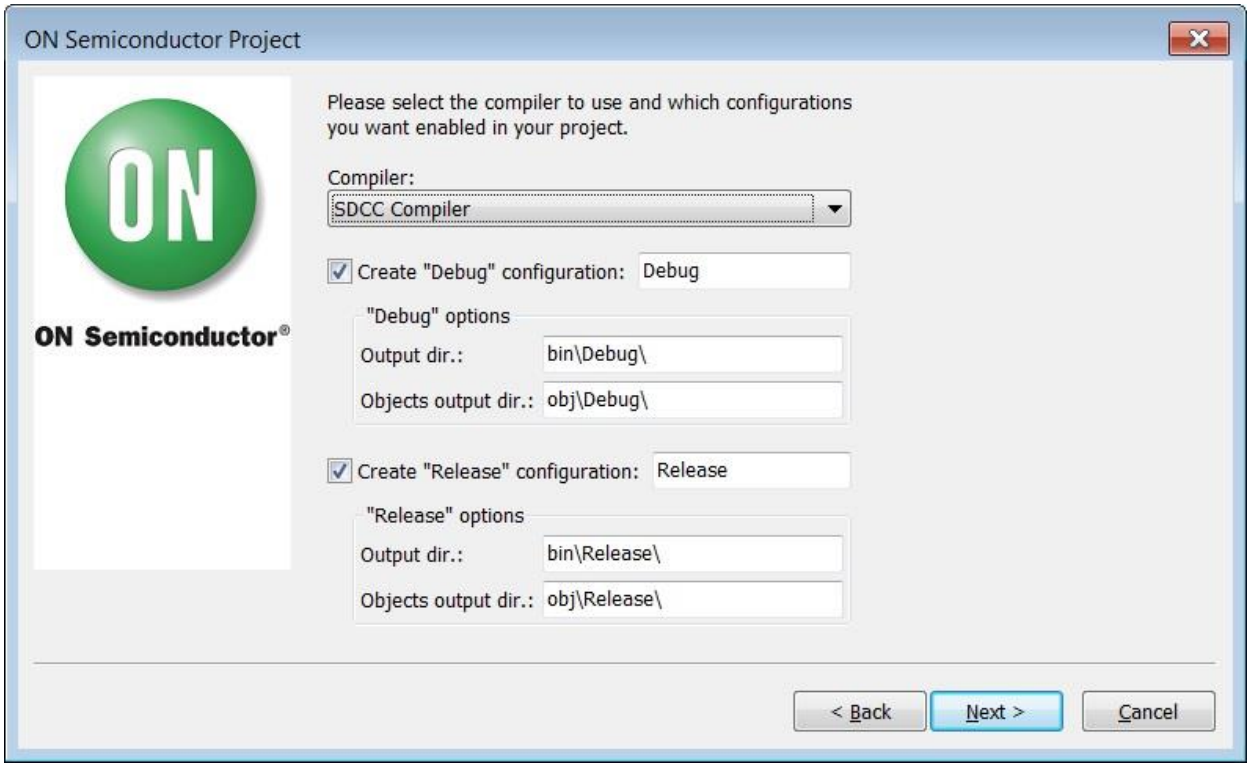
Click on *File* → *New* → *Project* and Choose ON Semiconductor *Project:*

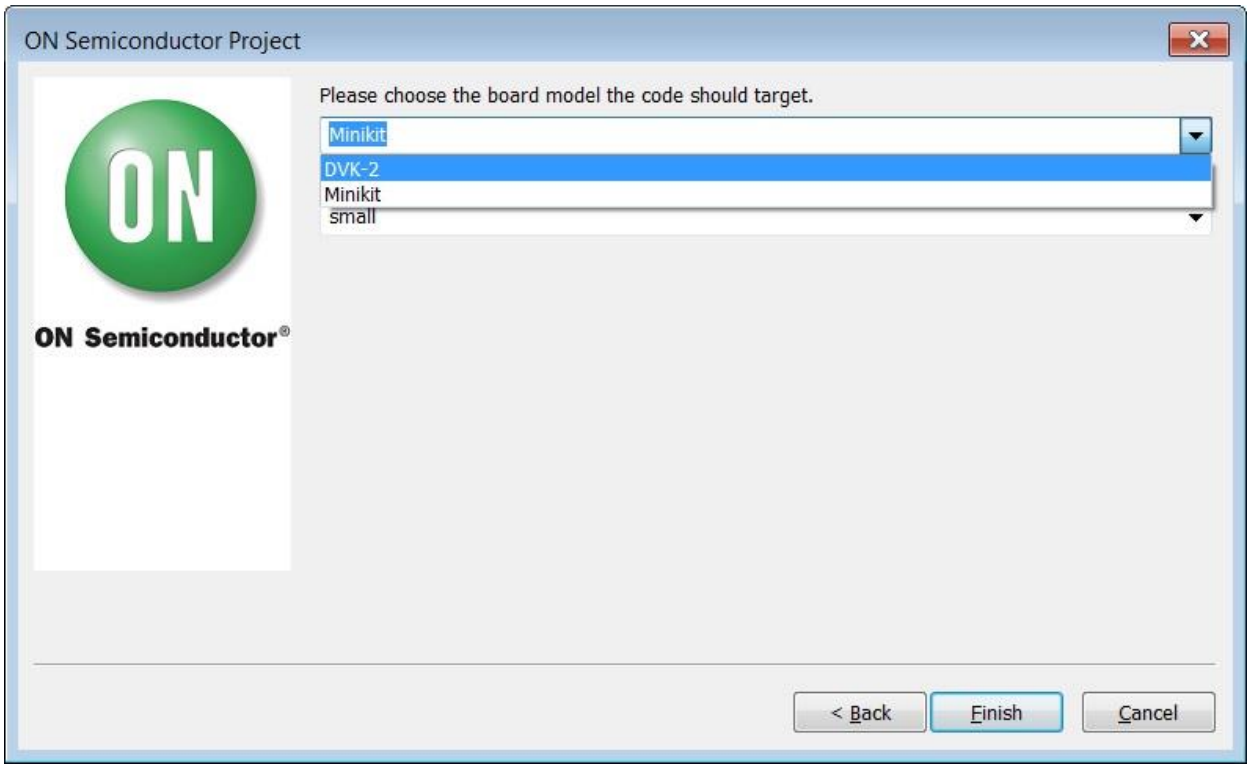


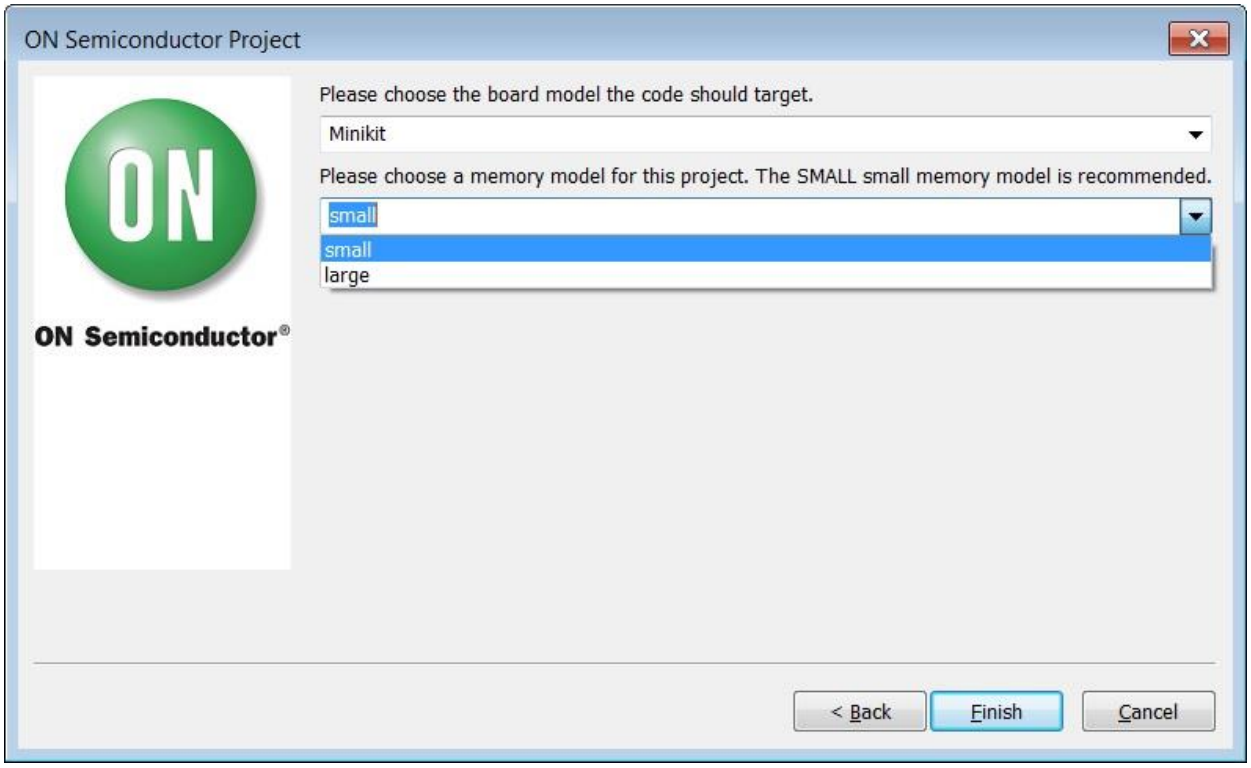
A dialog will pop-up. Go through it and change the settings if needed. The following screenshots are intended as examples.






ON Semiconductor Project
ON Semiconductor®
Please select the compiler to use and which configurations you want enabled in your project.
Compiler:
SDCC Compiler
Create "Debug" configuration:
Debug
"Debug" options
Output dir.:
bin\Debug\
Objects output dir.:
obj\Debug\
Create "Release" configuration:
Release
"Release" options
Output dir.:
bin\Release\
Objects output dir.:
obj\Release\
< Back
Next >
Cancel

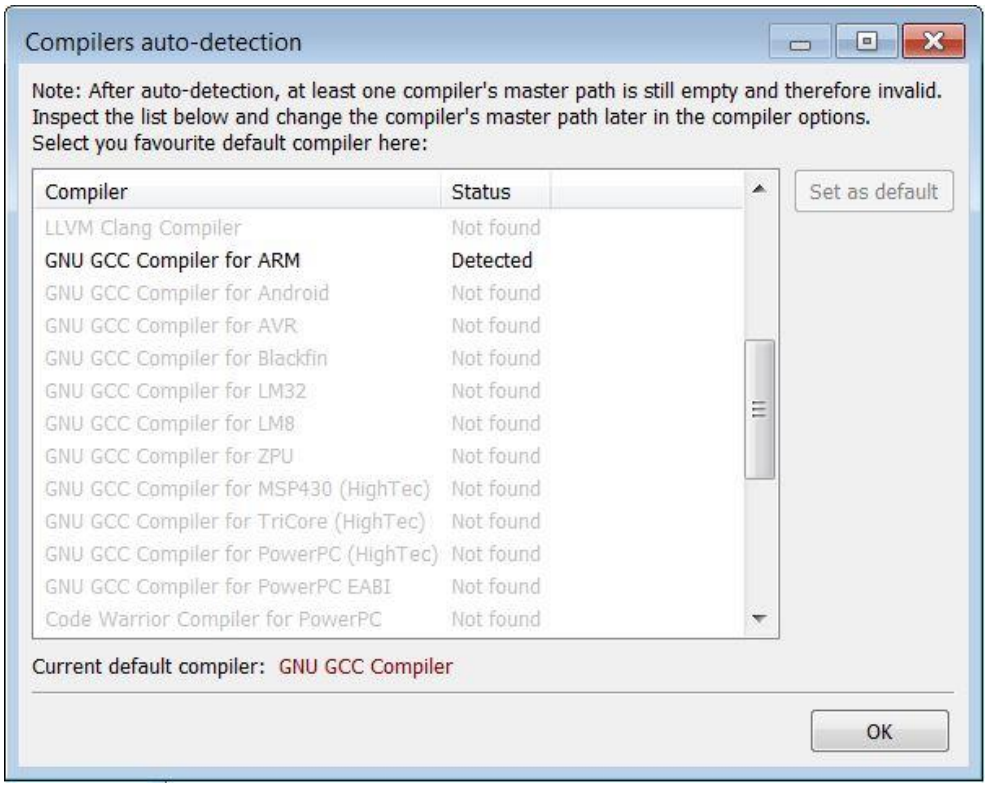

ON Semiconductor Project
ON Semiconductor®
Please choose the board model the code should target.
Minikit
DVK-2
Minikit
small
< Back
Finish
Cancel



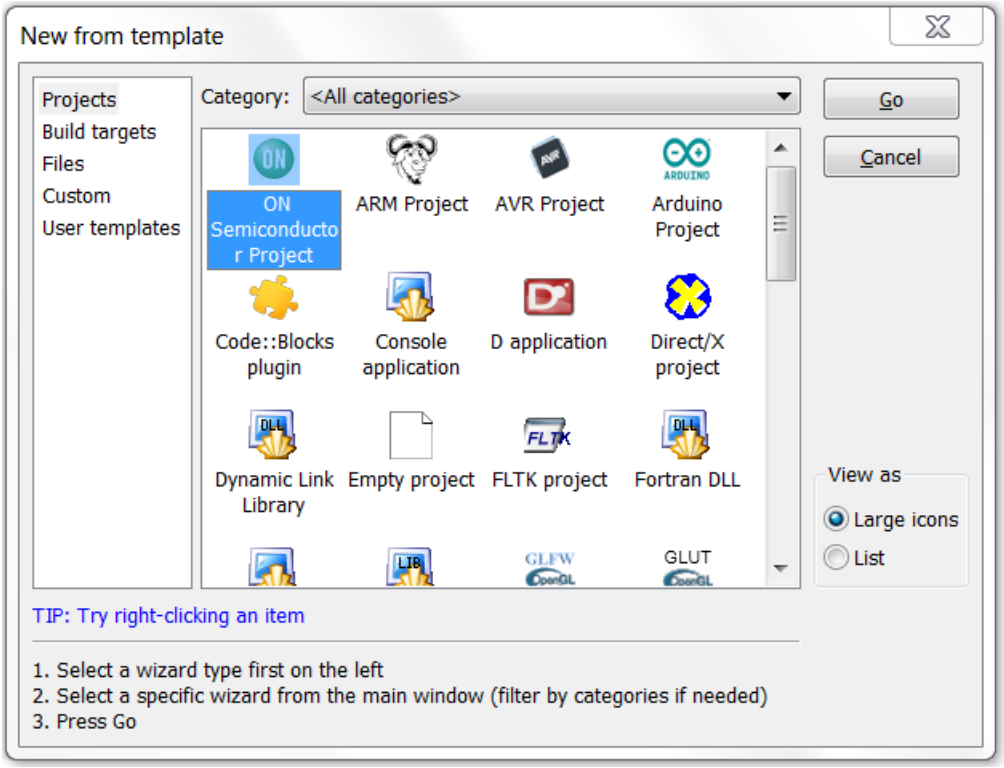
Clicking on *Finish* will create the new project. For your convenience the most important build options and compiler preferences are set automatically.

4.2. AXM0F243

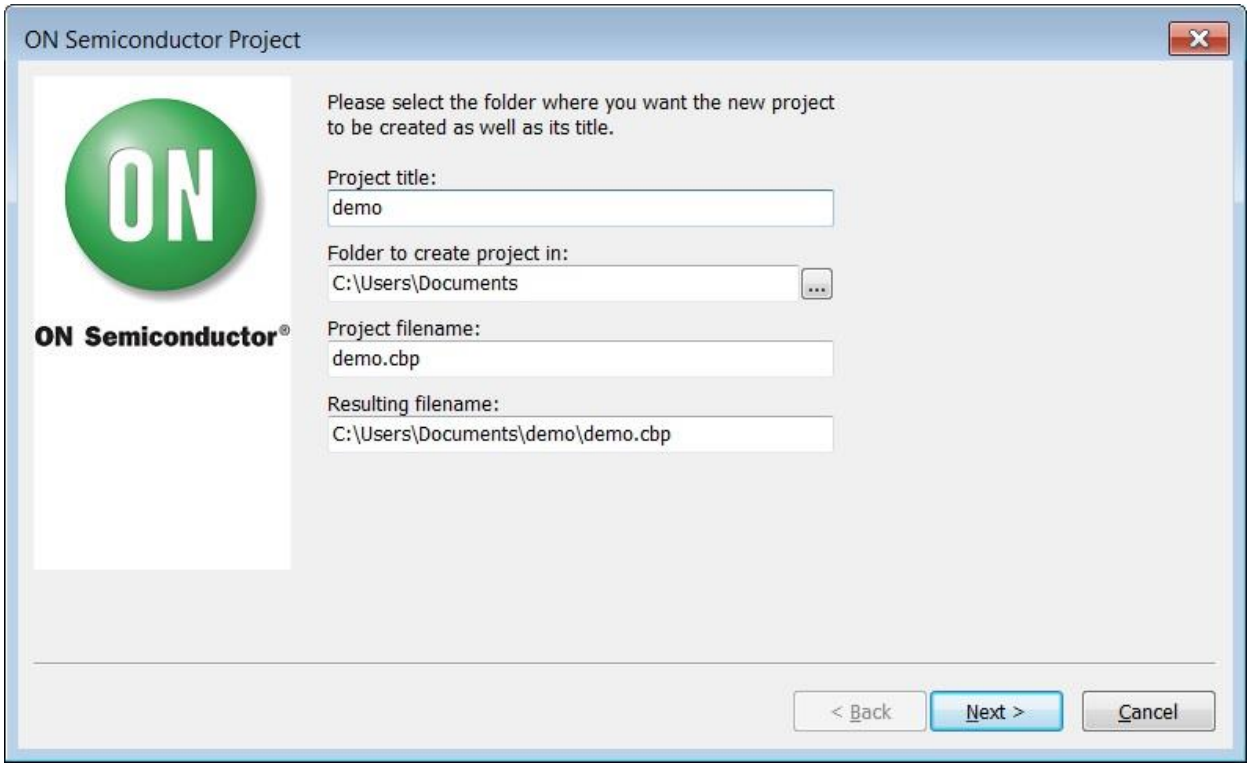
Start AxCode::Blocks. The first time AxCode::Block starts, it scans for installed compilers and presents a list of the compilers found. Select GNU GCC Compiler for ARM as default.

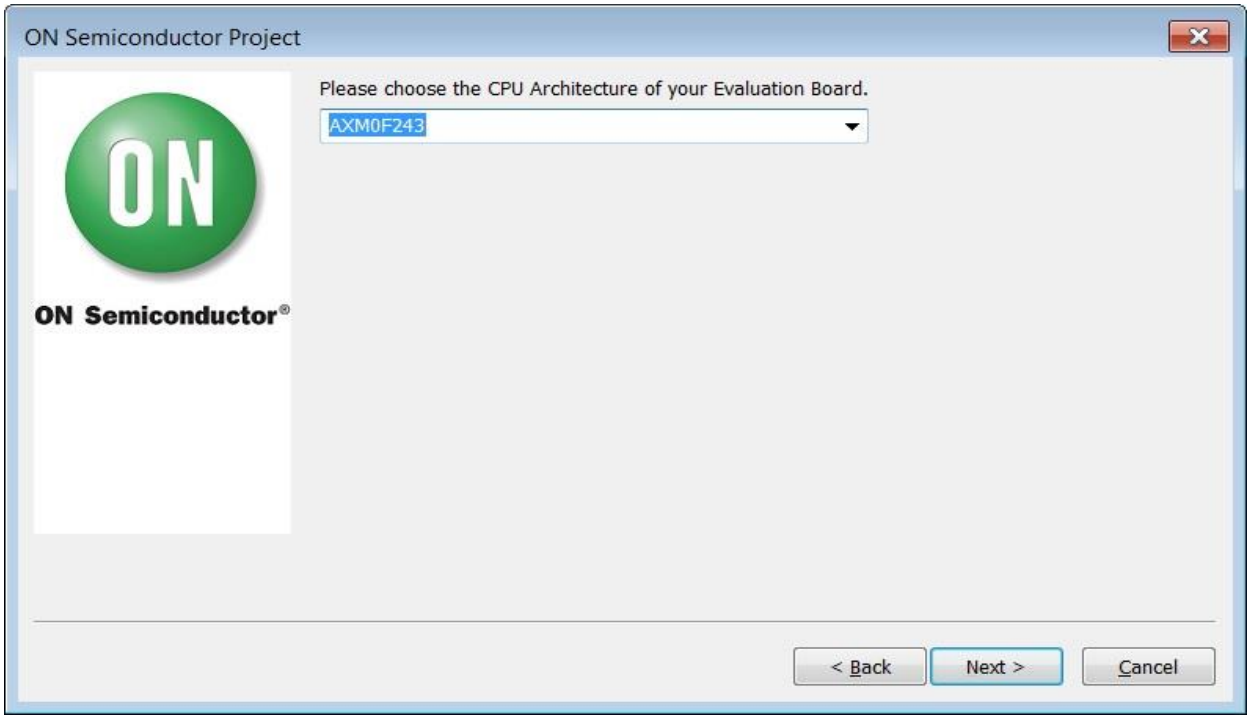


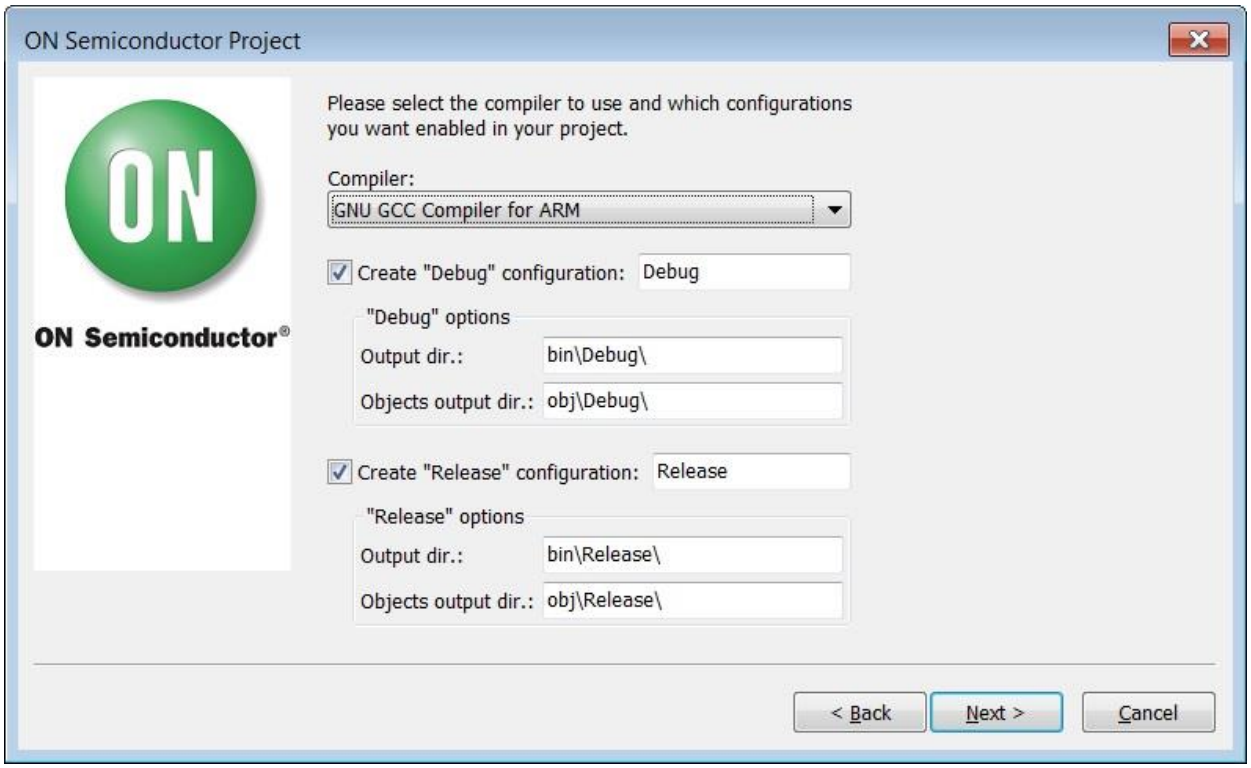
Click on *File* → *New* → *Project* and Choose ON Semiconductor *Project:*



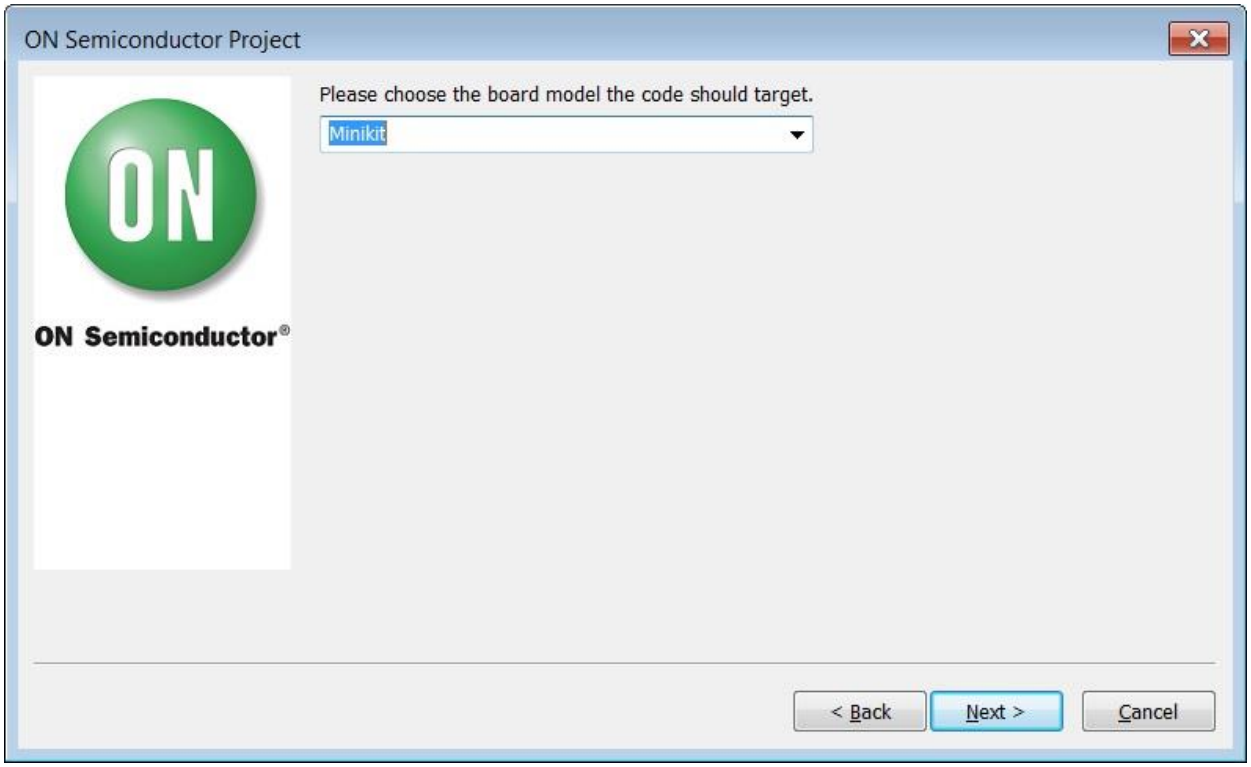
A dialog will pop-up. Go through it and change the settings if needed. The following screenshots are intended as examples.



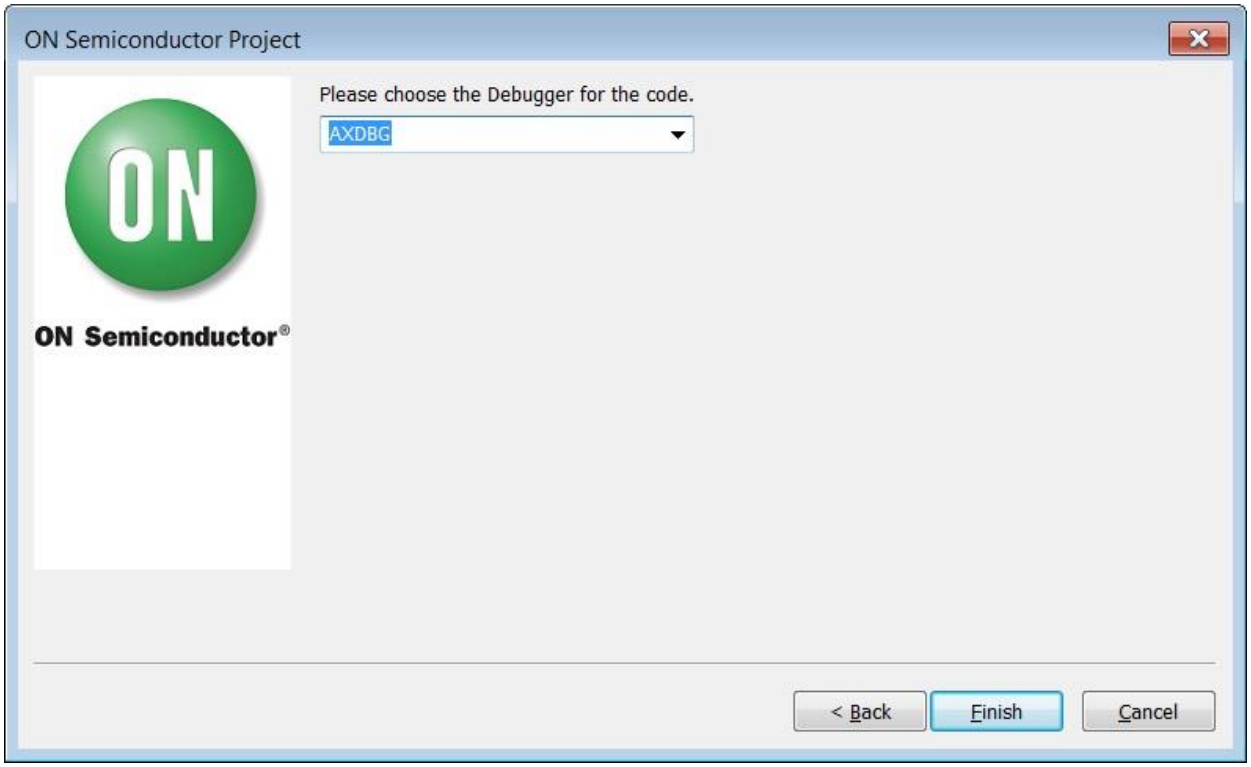

ON Semiconductor Project
ON Semiconductor®
Please choose the CPU Architecture of your Evaluation Board.
AXM0F243
< Back
Next >
Cancel


ON Semiconductor Project
ON Semiconductor®
Please select the compiler to use and which configurations you want enabled in your project.
Compiler:
GNU GCC Compiler for ARM
Create "Debug" configuration:
Debug
"Debug" options
Output dir.:
bin\Debug\
Objects output dir.:
obj\Debug\
Create "Release" configuration:
Release
"Release" options
Output dir.:
bin\Release\
Objects output dir.:
obj\Release\
< Back
Next >
Cancel

Choose the board model as *Minikit* for AXM0F243

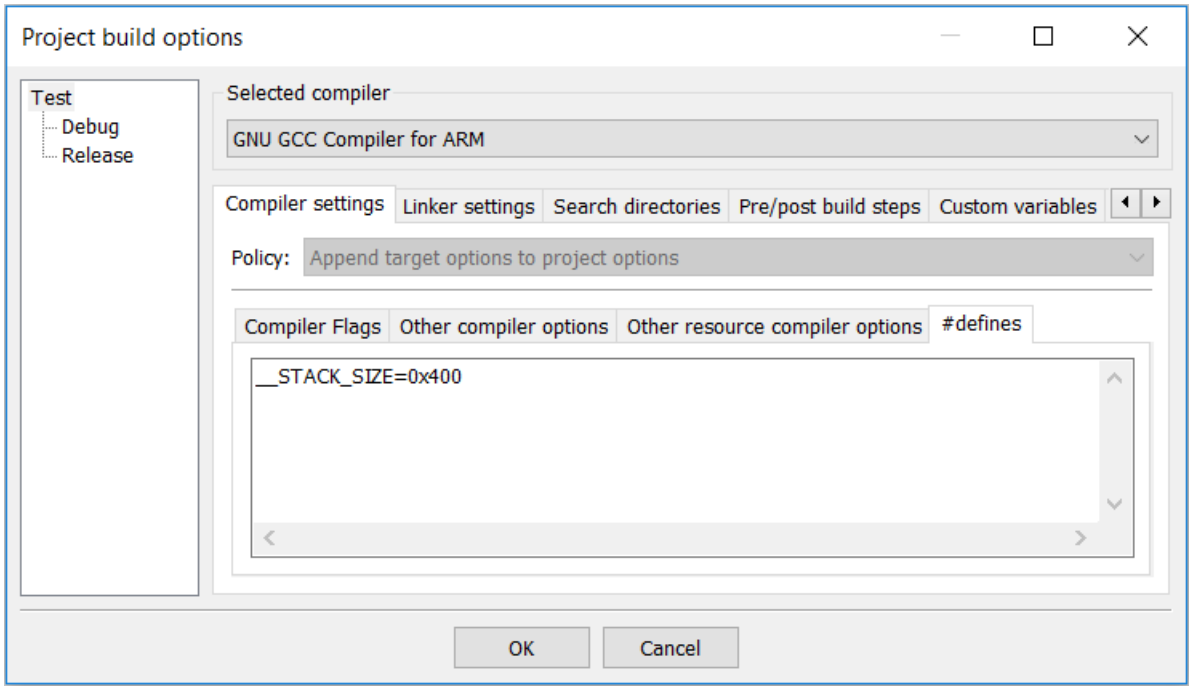


Choose the Debugger as *AXDBG*



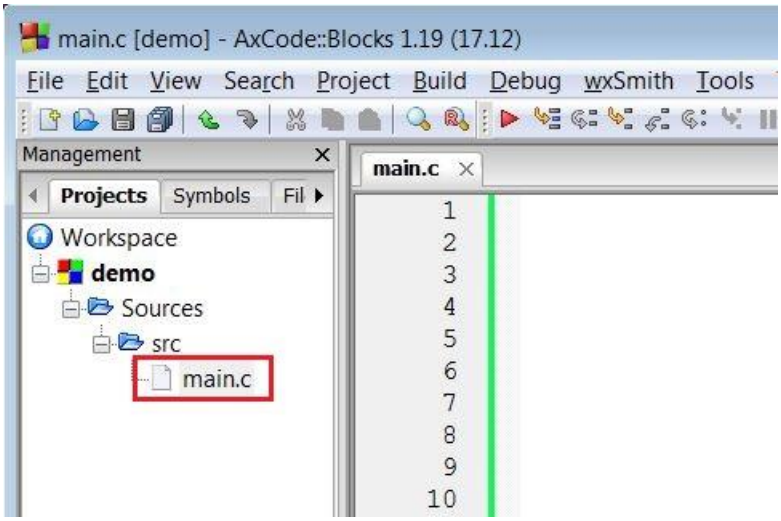
Clicking on *Finish* will create the new project. For your convenience the most important build options and compiler preferences are set automatically.

After creating the project, user has the option to modify the stack size for AXM0F243 firmware using the macro **"__STACK_SIZE**" which is defined in "Project build options" window under compiler settings.



5. Adding and Editing Files

An example source file has been included. You can open it by double-clicking its name on the project tree:



You can add existing files to the project using the menu entry *Project → Add Files.*
You can add new files to the project using the menu entry *File → New → File.*

Open files are shown on the right pane and can be edited.

6. COMPILING THE PROJECT

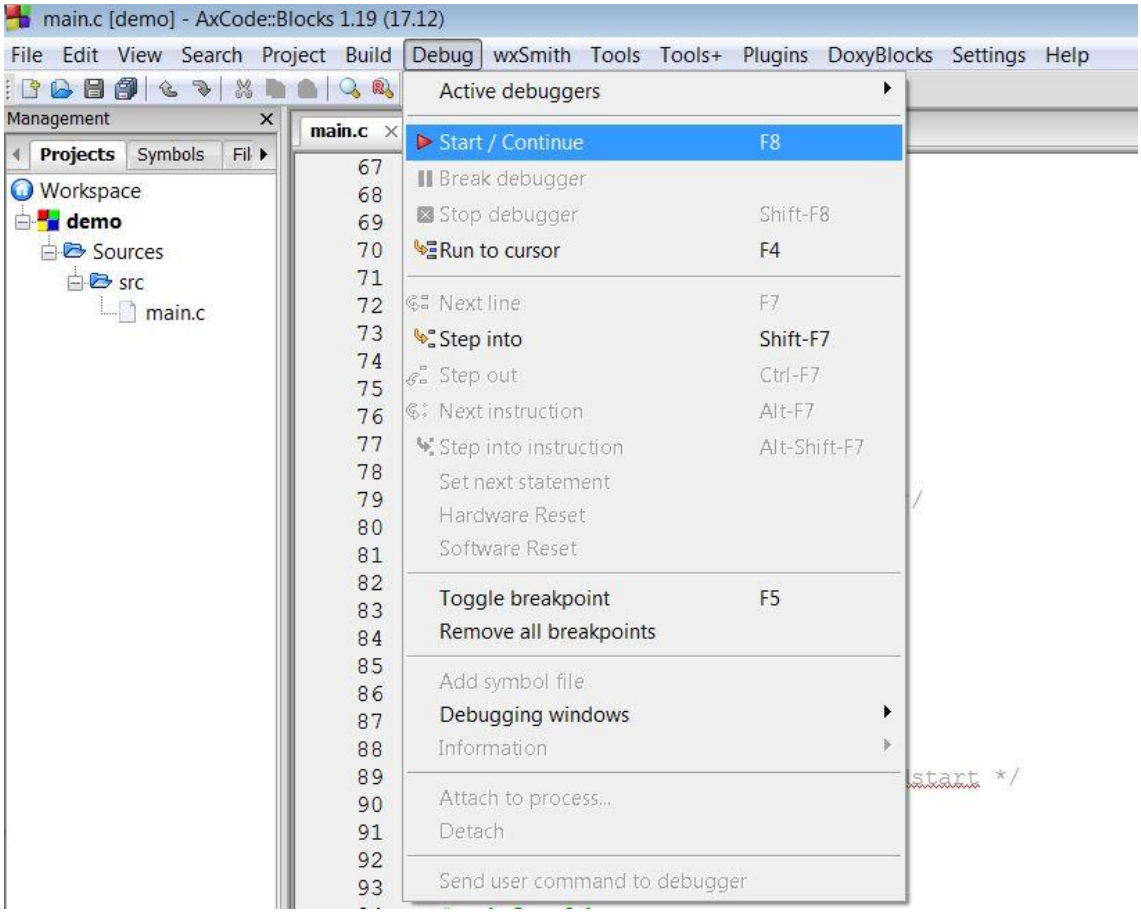
The most important function can be accessed through the compiler toolbar:

①	*Build*	Compile and link the project
②	Rebuild	Delete existing files and build
③	Abort	Stop the building process
④	Build target	The Debug target generates automatically debug informations

7. Programming and Debugging the Project

7.1. Programming the project

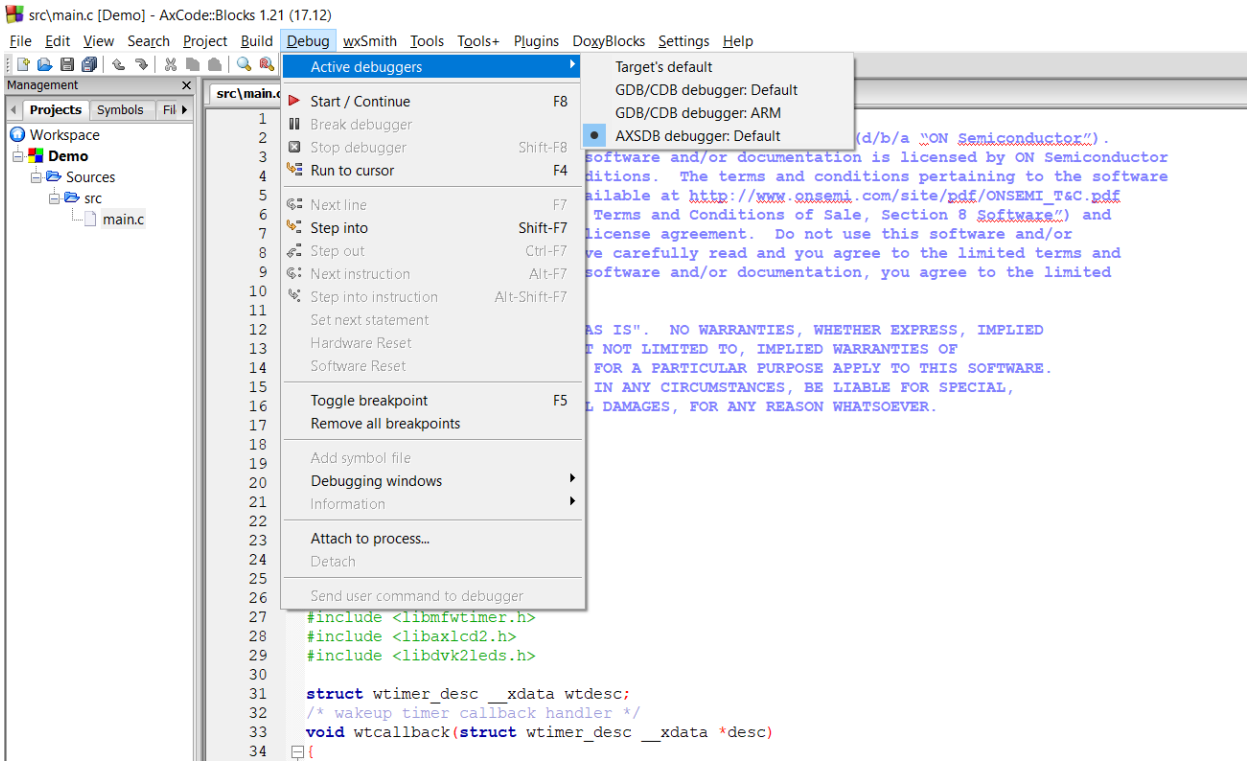
For just programming the device, choose Start / Continue option under *Debug* menu as shown in the image below or hit the option ① in the debugger tool bar.



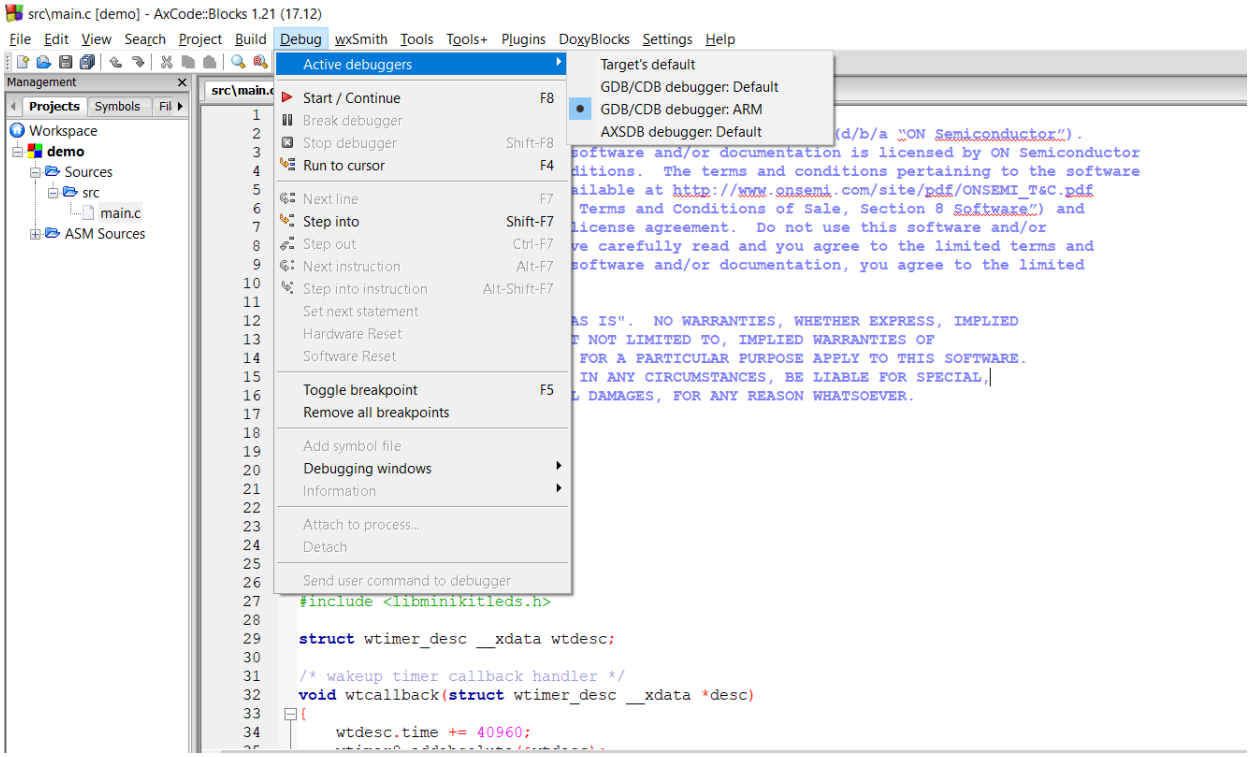
7.2. Debugging the project

Select the Debugger under *Debug → Active debuggers* and make sure the corresponding toolbar is visible (*View → Toolbars → Debugger*).

For AX8052, choose either *AXSDB debugger: Default* option or *Target's default* option under *Debug → Active debuggers* as shown below.



For AXM0F243, choose either *GDB/CDB debugger: ARM* option or *Target's default* option under *Debug* → *Active debuggers* as shown below.



Before the debugging process is started, the toolbar looks like this:

1

By hitting ① the debugger is started. If no devices are found, an error message is issued[1]. If exactly one device is found, the device is automatically connected.

If changes are made to the project since the last build, the project is automatically compiled.

When debugging is started and once the device is programmed, the toolbar changes its appearance to

2 3 4 5

The pause button ② stops the execution of the program to examine its state. The cursor inside the editor is moved to the line corresponding to the current instruction. For AX8052, Button ③ does not stop the execution, but disconnects the device and exits the debugger. For AXM0F243, Button ③ stops the execution and exits the debugger. ④ and ⑤ are used to reset the microcontroller. Options ④ and ⑤ are available only for the AX8052 microcontroller.

When a breakpoint in the code is hit or after hitting the pause button ② other functions become enabled:

6 7 8 9 10 11

⑥ *Run to cursor* Execution is stopped on the selected line

⑦ *Next line* Execute the next line in the source code

⑧ *Step into* Execute the next line, if it's a function step into it

⑨ *Step out* Continue execution until the end of the current frame

⑩ *Next instruction* Execute the next assembly instruction

Due to limitations in the debug information of 8052 compilers, the stepping commands ⑦, ⑧ and ⑨ require the microcontroller to be single-stepped. It can therefore take a long time until these commands terminate. It is always possible to stop one of these commands

[1] If you get an error message although a device is connected, you likely are missing the drivers. Open the *Control Panel* and navigate to the *Device Manager*. Find the unrecognized devices (look for the exclamation marks) named "USB Serial Converter A" or "USB Serial Converter B" or "USB Composite Device", right-click them and choose to install or update the driver. Do not search online for the driver. As search directory give the directory where you installed AXSDB followed by "\ftdi", e.g. "C:\Program Files (x86)\ON Semiconductor\AXSDB\ftdi". Eventually, you need to disconnect the device and restart AxCode::Blocks.

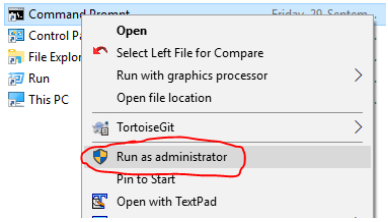
prematurely by hitting the pause button ② Usually, it is preferable to set breakpoints or use the Run-To-Cursor feature over the stepping commands.

The drop-down menu ⑪ can be used to open the debugging windows described in the next chapter.

7.3. OPEN OCD COMMANDS

This section will outline on how to start GDB server, connect device and execute Open OCD commands on the device. For AXM0F243 microcontroller, OpenOCD debug interface software is used for programming and debugging using the GDB (GNU) debugger.

1. Open a command prompt with 'Run as administrator'

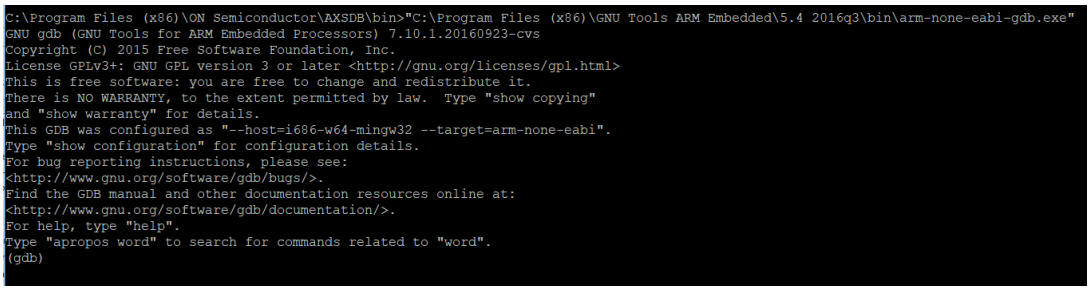


2. Go to working directory

$ cd "C:\Program Files (x86)\ON Semiconductor\AXSDB\bin"

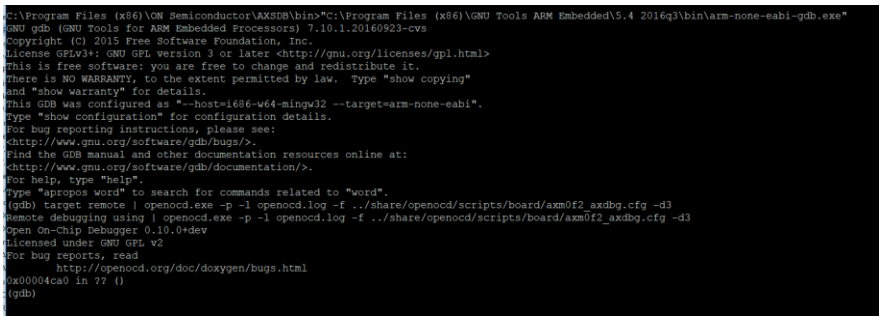
3. Start gdb sever

$ "C:\Program Files (x86)\GNU Tools ARM Embedded\5.4 2016q3\bin\arm-none-eabi-gdb.exe"



4. Launch open OCD

(gdb) target remote | openocd.exe -p -l openocd.log -f ../share/openocd/scripts/board/axm0f2_axdbg.cfg -d3



5. Open OCD commands to control and monitor device and flash

Device commands

Device reset halt

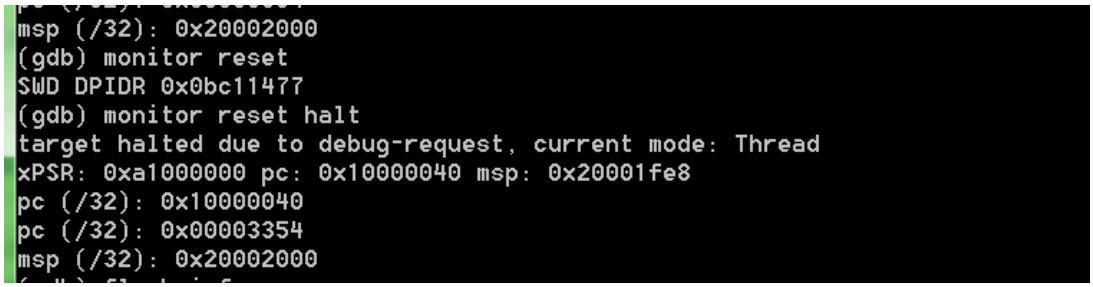
(gdb) monitor reset halt

Device halt

(gdb) monitor halt

Device reset

(gdb) monitor reset



Flash commands

Flash Erase (Erase command is not supported as auto erase is enabled for the flash write)
(gdb) monitor flash erase_address <address> <length>

Flash Read

(gdb) monitor flash read_bank <bank_num> <file_name.bin> <address_offset> <length>

E.g.: monitor flash read_bank 0 filename.bin 0x0 0x100

Flash Write

(gdb) monitor flash write_bank <bank_num> <file_name.bin> <address_offset>
(gdb) monitor flash write_image <filename.elf>

E.g.: monitor flash write_image D:/test/MASTER_AXM0f2-GNU.elf

Flash verify

(gdb) monitor flash verify_bank <bank_num> <file_name.bin> <address_offset>

E.g.: monitor flash verify_bank 0 filename.bin 0x0

Flash info

(gdb) monitor flash info <bank_num>

Flash probe

(gdb) monitor flash probe <bank_num>

Flash banks list

(gdb) monitor flash banks

Flash fill

(gdb) monitor flash fillw <addrs> <val> <len>

```
(gdb) monitor flash write_image D:/test/MASTER_AXM0f2-GNU.elf
Flash Download Started
Downloaded  4224 of 26850 bytes
Downloaded  8576 of 26850 bytes
Downloaded 13056 of 26850 bytes
Downloaded 17536 of 26850 bytes
Downloaded 22016 of 26850 bytes
Downloaded 26496 of 26850 bytes
Flash Download Completed
wrote 26850 bytes from file D:/test/MASTER_AXM0f2-GNU.elf in 6.176000s (4.246 KiB/s)
(gdb)
```

Note: As AXM0F243 has single flash bank, <bank_num> will always be 0 (zero).

More detailed description of the open OCD commands can be found at
http://openocd.org/doc/pdf/openocd.pdf

8. Debugging Windows

8.1. Breakpoints

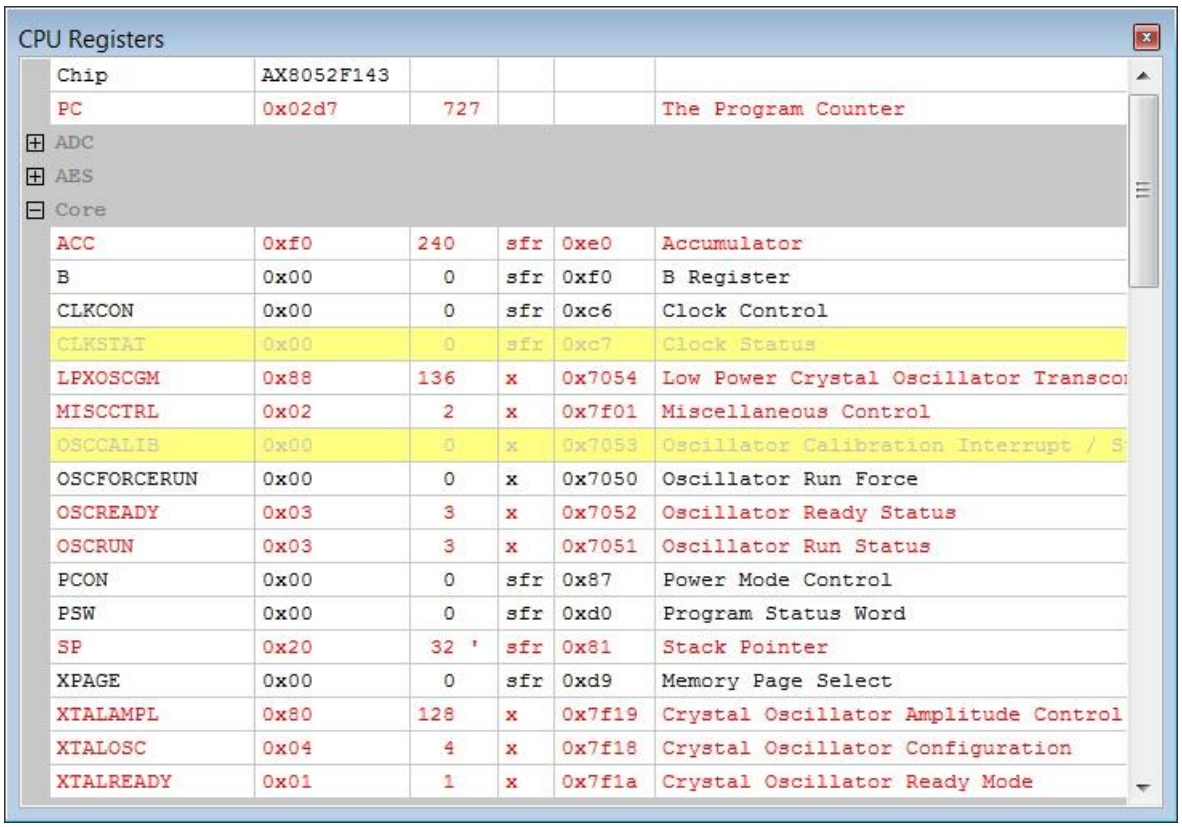
This window simply displays a list of the breakpoints set. In order to set a breakpoint, click on the left of the corresponding line in the editor or hit *F5*. The same procedure removes an already set breakpoint.

8.2. CPU Registers

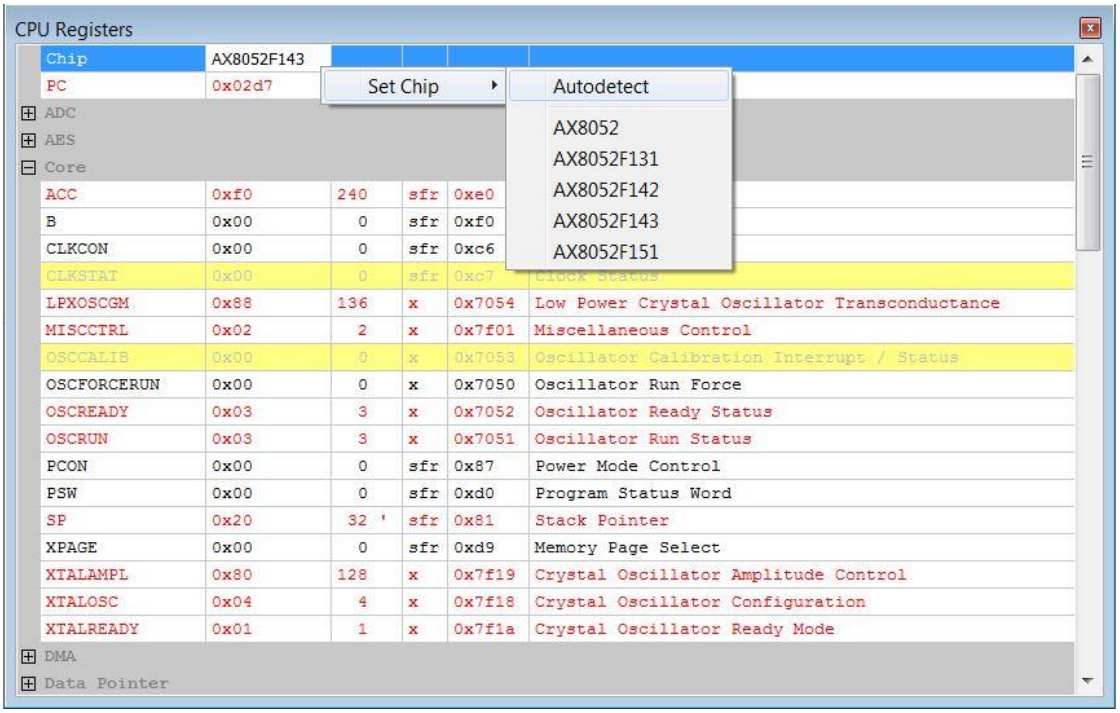
AX8052:

For Ax8052 microcontroller, this window shows the register contents while the microcontroller is stopped. Registers of radio Chips or SoC functions are also displayed.

Registers are grouped into sections. Light gray bars show the section name, the + or – sign to the left of the section name allows to show or hide the section.

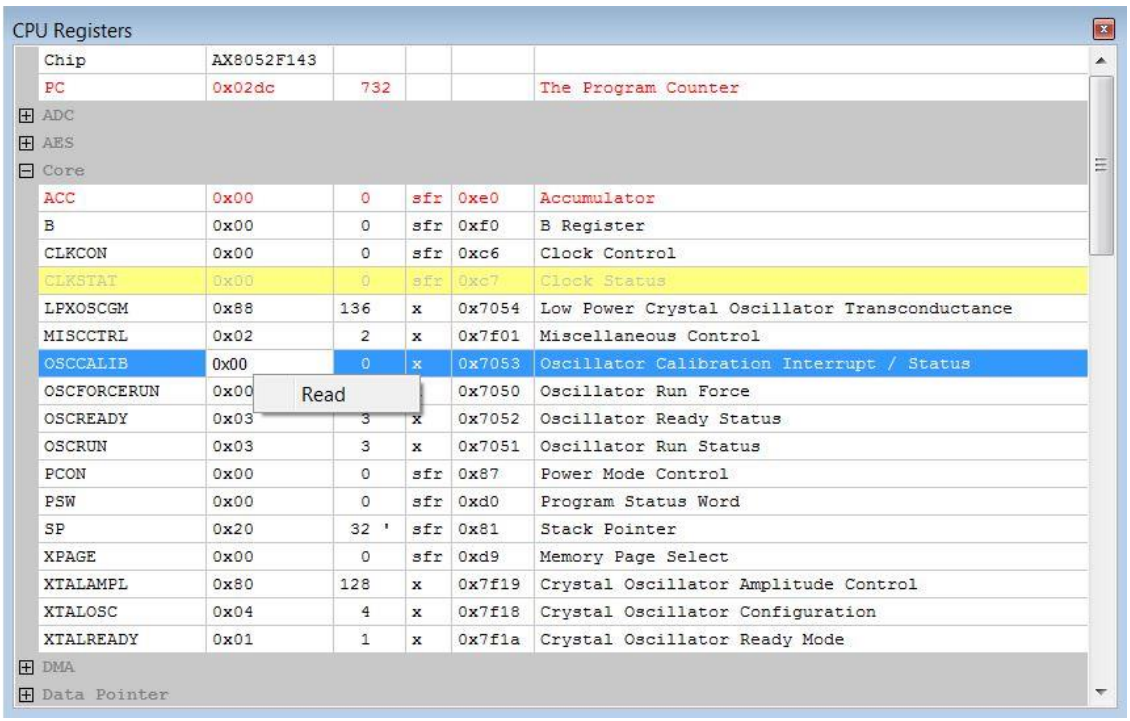


The first line of the dialog shows the name of the chip. The chip is normally auto-detected. Should auto-detection fail, the chip type can be manually set by right-clicking on the chip name.

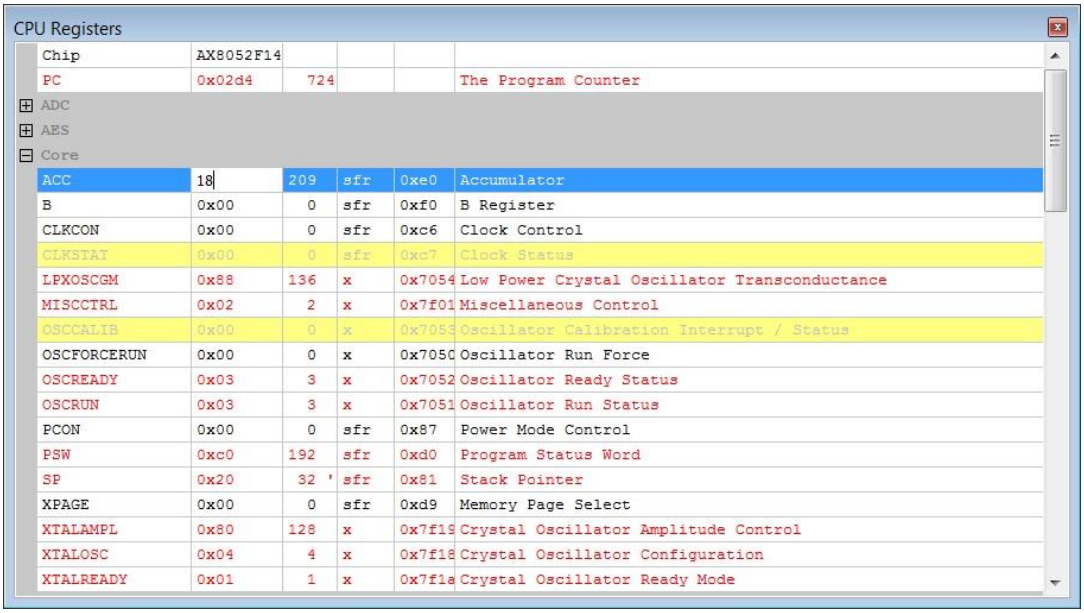


Registers and their contents are shown in the remaining rows. The first column shows the register name. The second column shows the current register contents as a hexadecimal number. The third column displays the register contents as a decimal number; if this number is greater or equal 32, it is also displayed as ASCII character. The fourth and fifth columns display the address space and the address of the register, while the sixth column displays a short description of the register.

Registers that have changed since the last processor break are displayed in red. Registers that can cause side effects when read are not automatically read. They are displayed with a light yellow background. Their values are also shown in light-gray, if they have not yet been read.



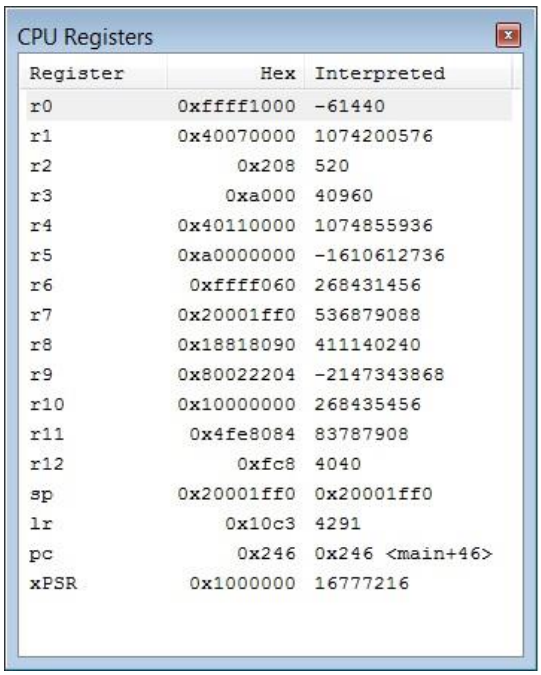
Registers can be (re-)read by either right-clicking into the row and selecting Read, or by selecting the row and pressing the space-bar.



Register values can be changed by clicking into the second column and entering a number. Numbers can be entered both in decimal format (eg. 18), as well as hexadecimal format (eg. 0x12).

AXM0F243:

For AXM0F243 microcontroller, this window shows the Processor core register contents while the microcontroller is stopped.

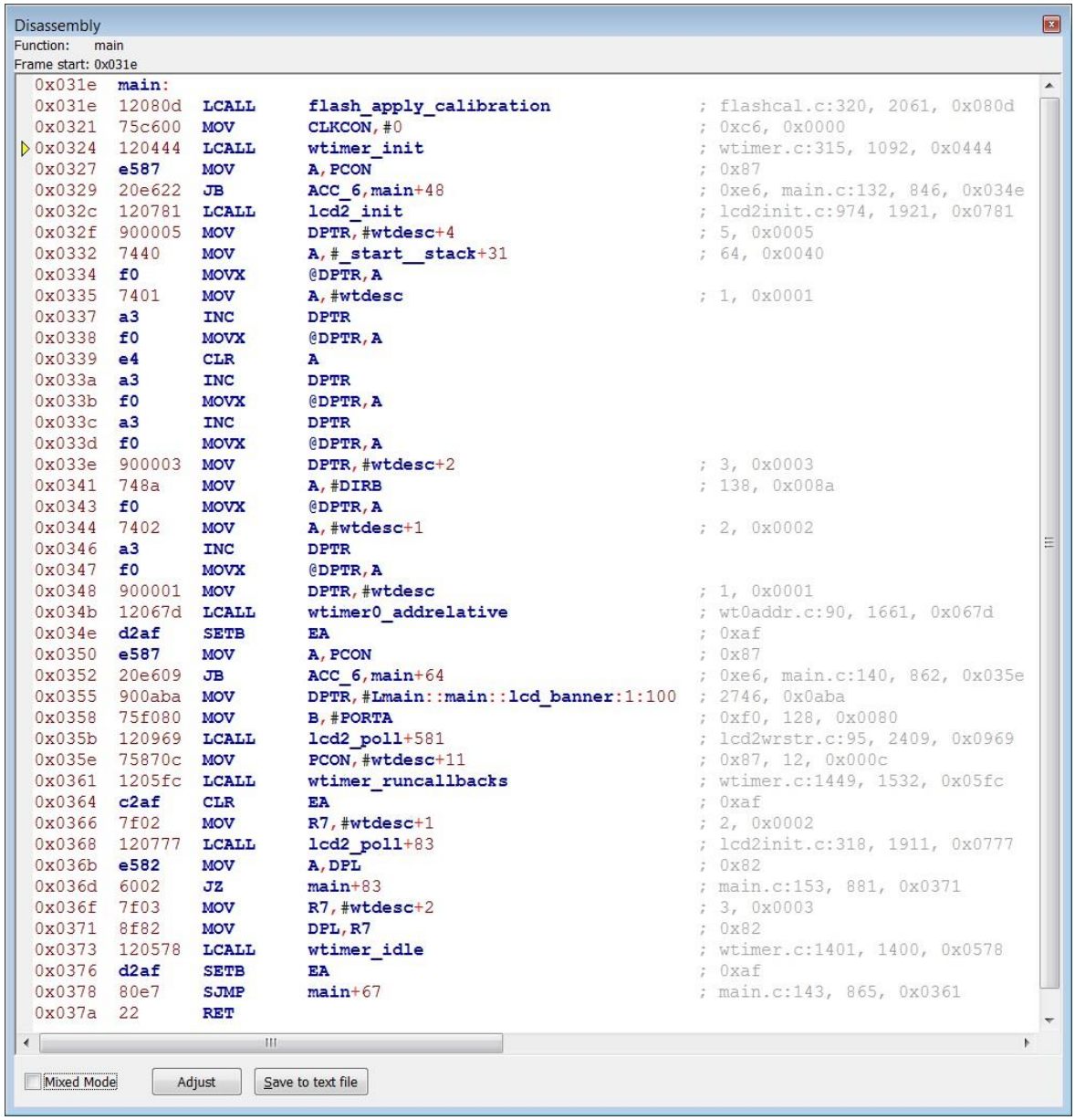


The IDE uses OpenOCD debug interface software for programming and debugging the AXM0F243 microcontroller. For more information on the OpenOCD software, refer http://openocd.org/

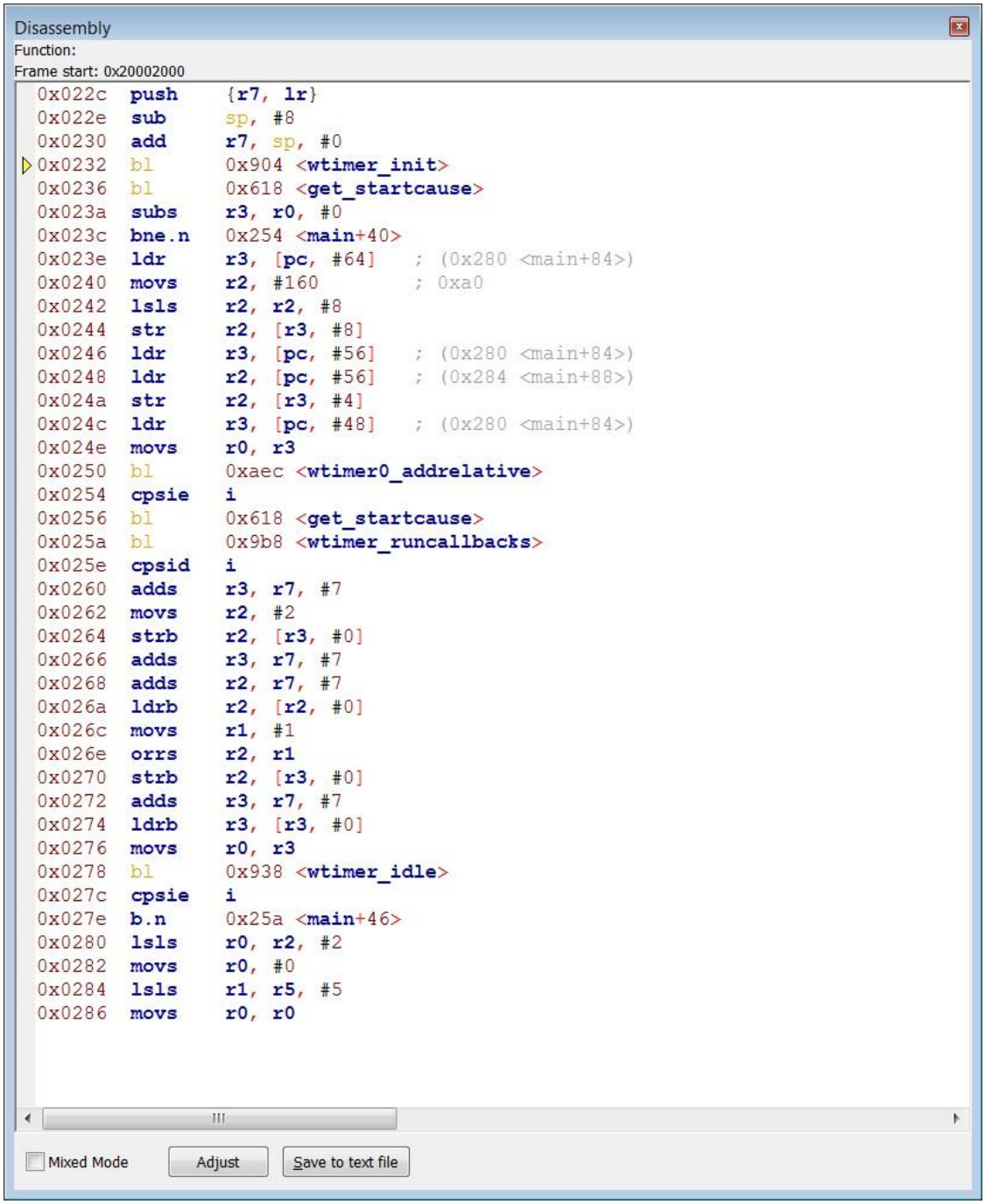
8.3. DISASSEMBLY

The disassembly window shows the disassembly of the current function. A yellow triangle indicates the next instruction that is executed when the microcontroller is stepped or run. If mixed mode is selected, assembly instructions are interspersed by C source lines.

AX8052 disassembly window is shown in the below image



AXM0F243 disassembly window is shown in the below image

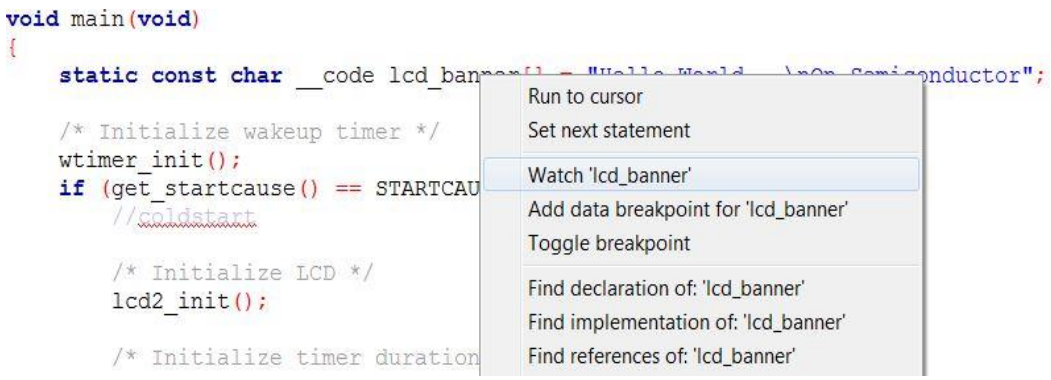


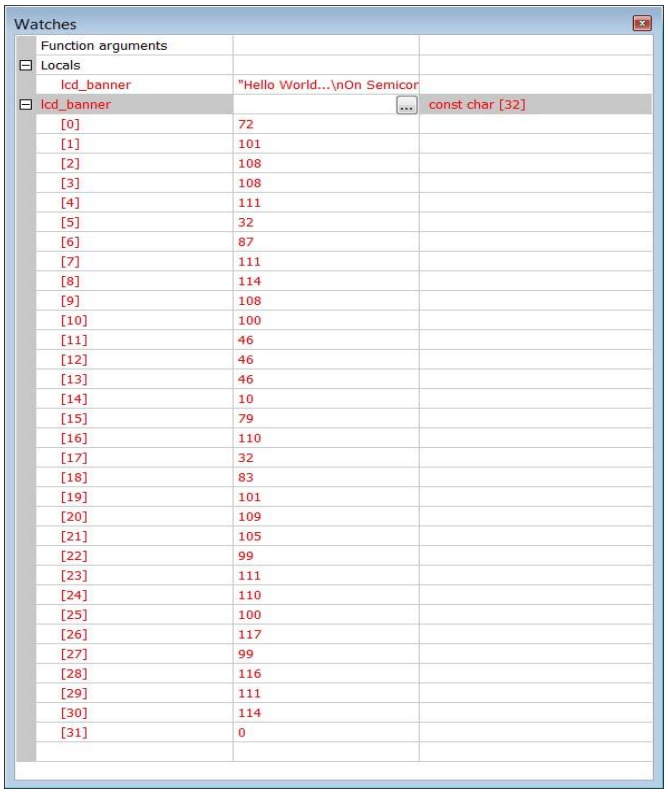
8.4. MEMORY DUMP

This dialog allows to read a range in the memory of the microcontroller unit and displays it.

8.5. WATCHES

Watches allow the user to monitor the content of a variable which may be defined only in the high-level programming language. The easiest way to add a watch is to right click on the name of the variable and to choose the corresponding menu entry:





The watch window is able to display complex variable types. The last line is empty; its purpose is to allow adding watches simply by typing a name into the first column of the last empty row. Watch variables can be deleted by right-clicking into the name field of the watch to be deleted. A context menu then allows to rename or delete the watch.

8.6. PIN EMULATION

This function emulates the two pins of the microcontroller occupied by the debugger. The direction (input or output) is automatically detected. For both directions, the logic state of the pin is shown. Additionally, the state of inputs can be toggled. This feature is available only for AX8052 microcontroller.

8.7. DEBUG LINK

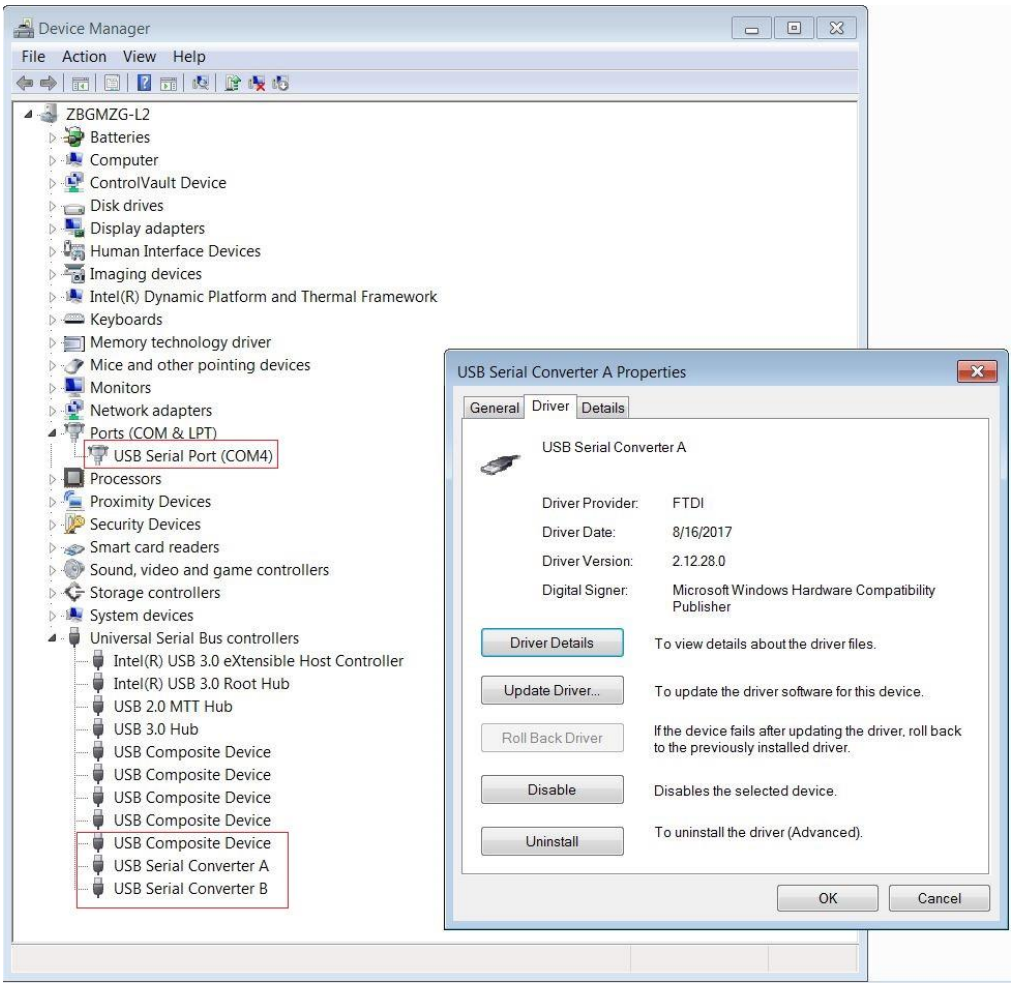
AX8052:

This window provides a graphical front-end to the debug link, a console-like input and output interface to the microcontroller unit. Local echo can be turned on for your convenience when the firmware is not providing a feedback. Please notice that the entry field is only active when the debugger is running.

AXM0F243:

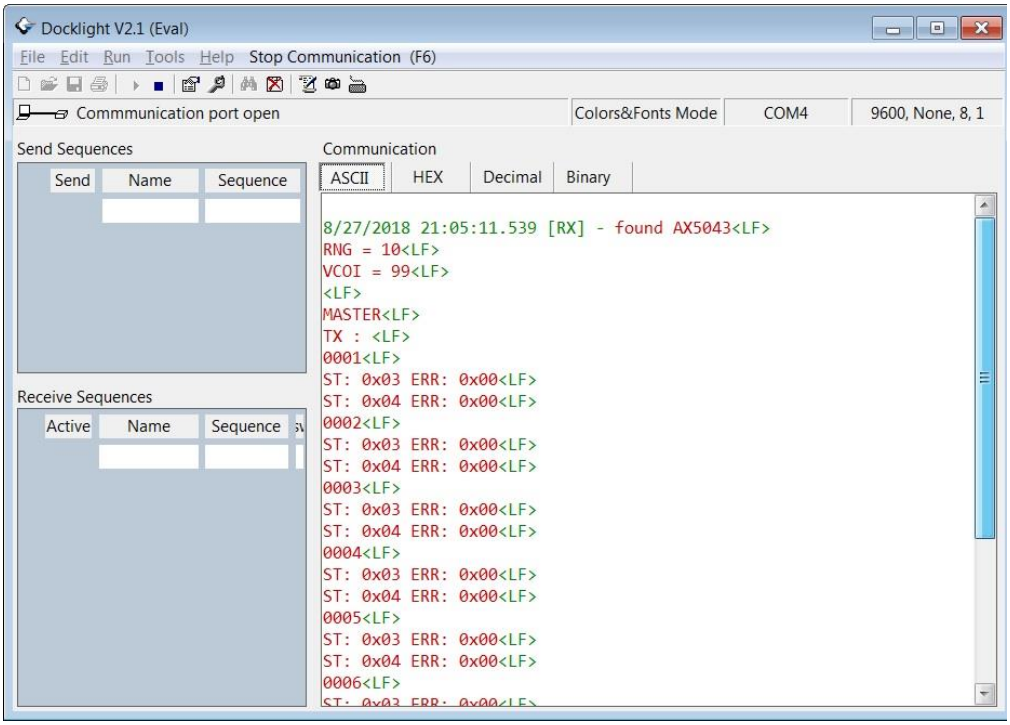
8.7.1. GENERAL SERIAL TERMINAL

For AXM0F243 microcontroller, the debug link data can be seen using any serial terminal software. Get the COM port (USB Serial Port) of the device from the device manager.



On the serial terminal software, set baud rate as 9600, Data bits as 8, Stop Bits as 1 and Parity as None.

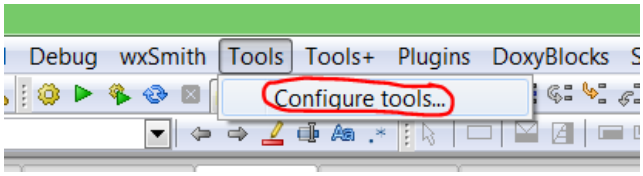
If the debug link options are enabled in the project, then debug messages can be seen on the serial terminal software as shown below.

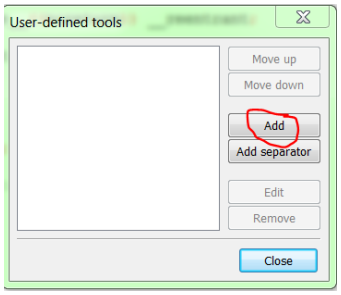


8.7.2. WINDOWS POWER SHELL AS SERIAL TERMINAL

Configure Serial Terminal on codeblocks menu in order to open serial port and receive debug information from the device on 'Windows power shell' window (Windows-7 built-in).

Step 1: Open Tools Dialog using Code::Blocks->Tools->Configure Tools->Add





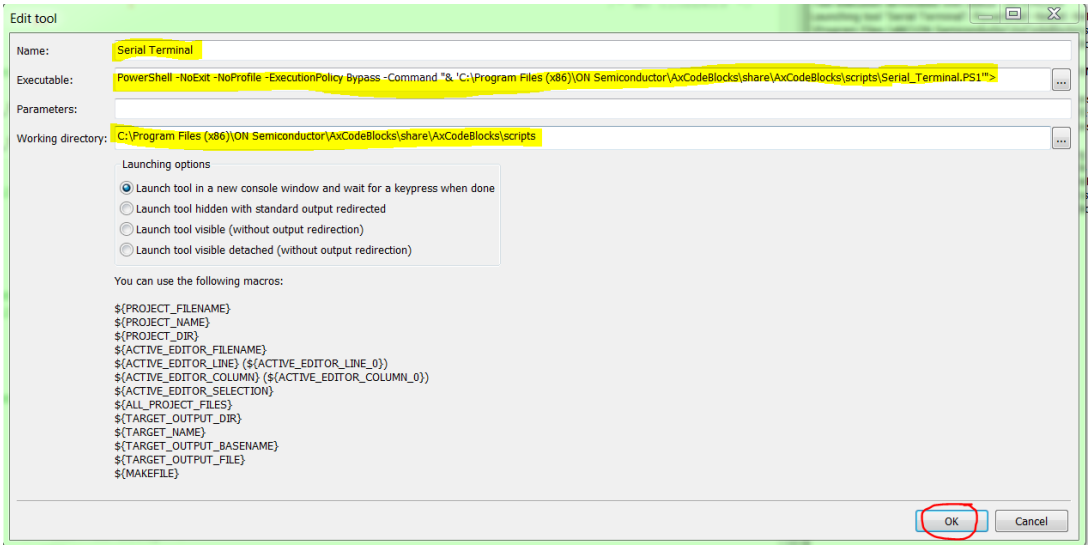
Step 2: Add below details at respective fields

Step 2.1: Name: <Serial Terminal>

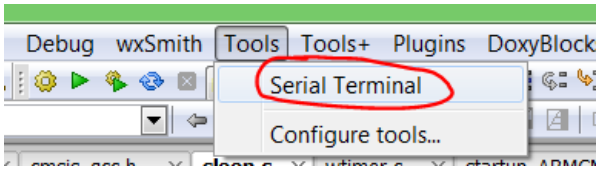
Step 2.2: Executable: <PowerShell -NoExit -NoProfile -ExecutionPolicy Bypass -Command "& 'C:\Program Files (x86)\ON Semiconductor\AxCodeBlocks\share\AxCodeBlocks\scripts\Serial_Terminal.PS1'">

Step 2.3: Working directory: <C:\Program Files (x86)\ON Semiconductor\AxCodeBlocks\share\AxCodeBlocks\scripts>

Step 2.4: Click OK



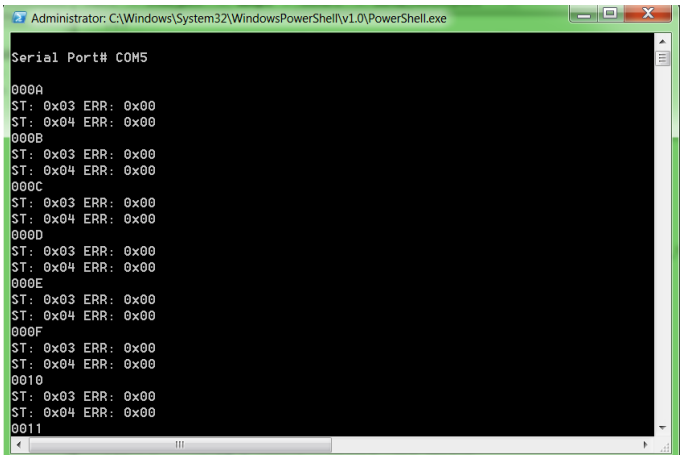
This will create 'Serial Terminal' item under the tools menu



Step 3: Open Serial Terminal window using Menu item

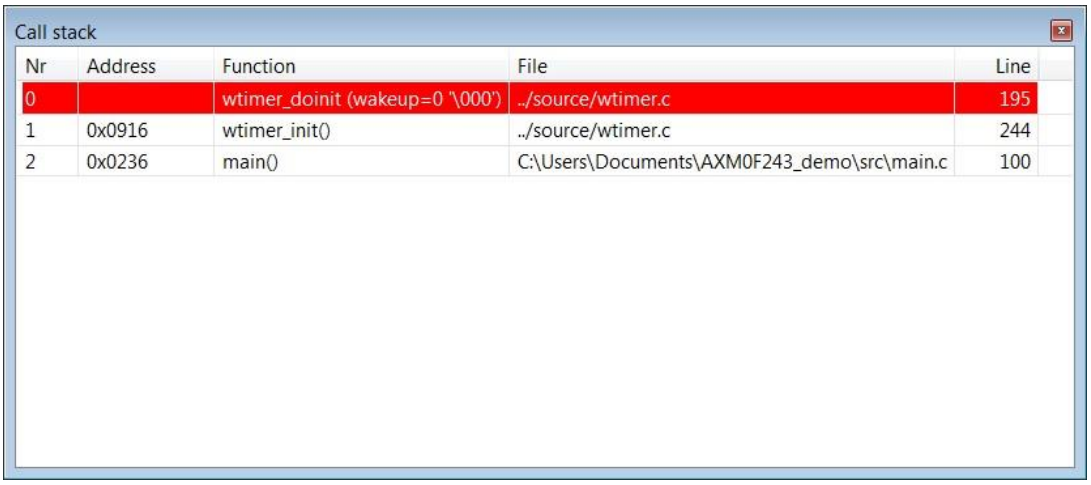
Code::Blocks->Tools->Serial Terminal

This will open 'windows power shell' window, opens serial port and receives Serial data from the device.



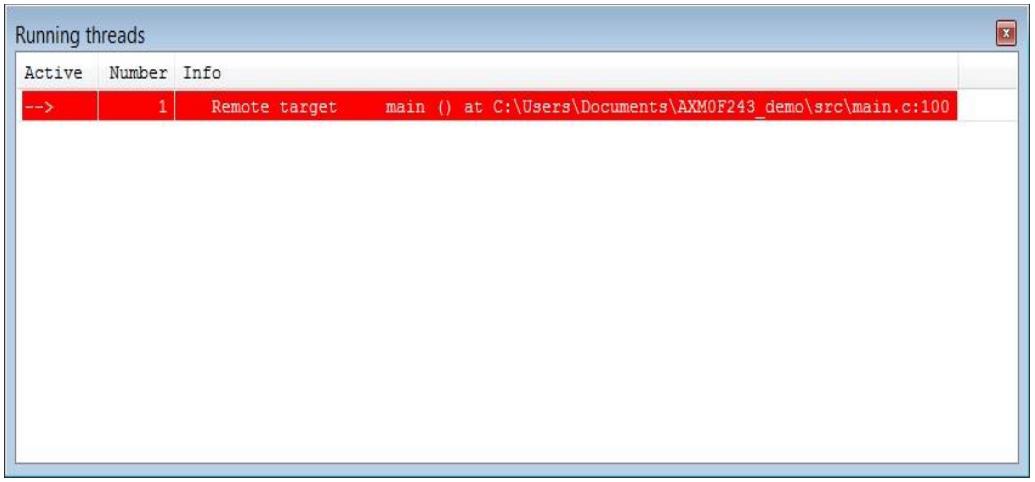
8.8. CALL STACK

Whenever the program is paused by a breakpoint or during manual stepping, the current stack is displayed in the call stack window. The call stack window displays the name of each function and the file name in which the function is present. This feature is supported only for AXM0F243 microcontroller. The call stack window is shown in the below image.



8.9. RUNNING THREADS

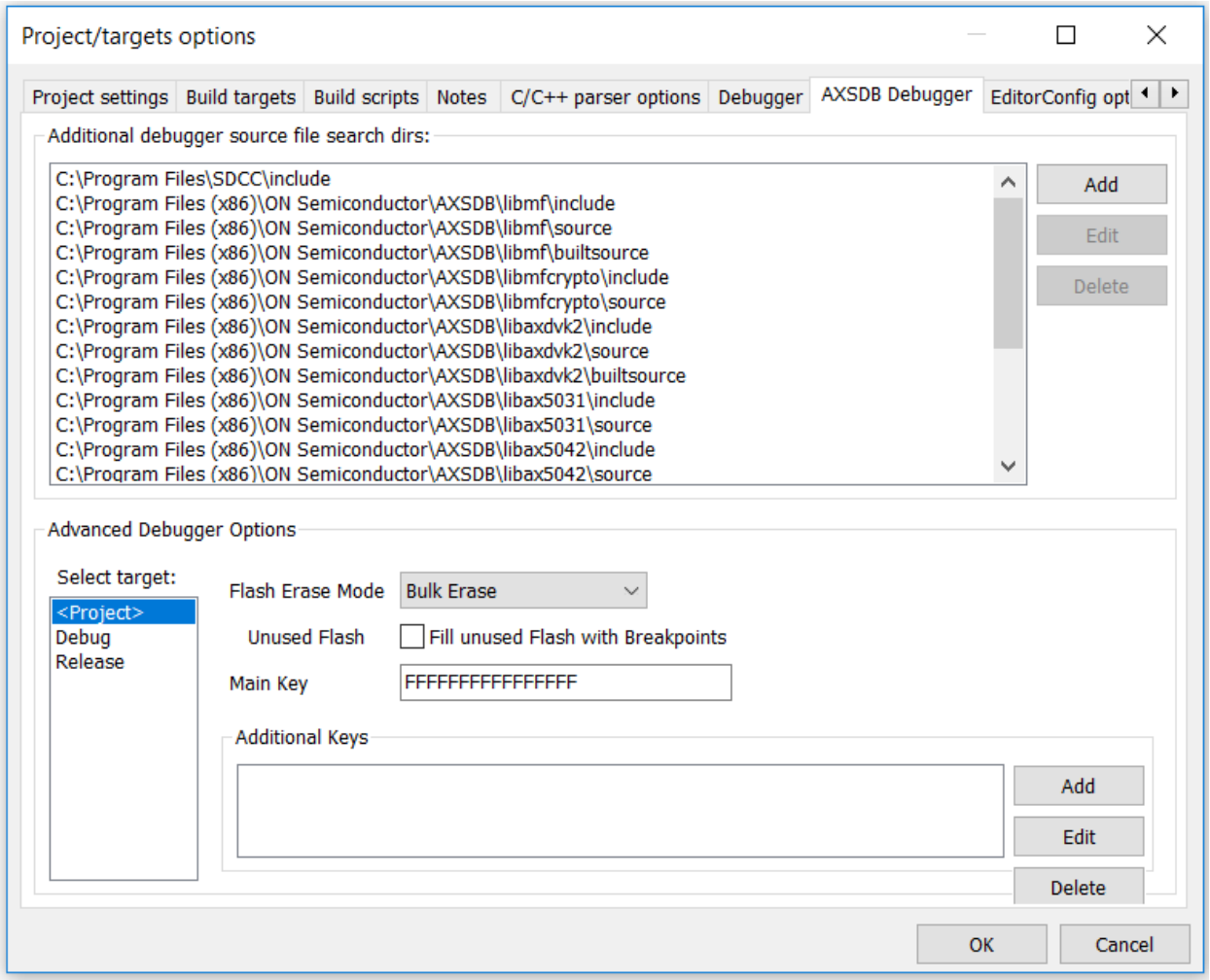
In the running thread window, the name of function that is currently executing will be shown. This feature is available only for AXM0F243 microcontroller. The running threads window is shown in the below image.



9. Advanced Debugger Configuration

9.1. AX8052

The advanced debugger configuration window can be reached by selecting Project→Properties… from the menu bar, and then clicking on the "AXSDB Debugger" tab.



Whenever the CPU stops, for example because it hits a breakpoint or the user hits the pause button, the debugger reads the current PC and looks up the file name and line number corresponding to that PC in the debug information. If this file is found neither in the open editor tabs, nor in the project directories, the debugger searches the directories listed under "*Additional debugger source file search dirs*". It is recommended to add the source and include directories of all used libraries (such as libmf) to the directory list to enable source level debugging even in library code.

Flash Erase Mode specifies the strategy the debugger uses to erase the flash memory before reprogramming. *Bulk Erase*, the default, sends a bulk erase command to the microcontroller, thus erasing the complete memory. If the debugger knows the device key, it saves and restores the calibration data in the last flash sector. Bulk erase may be issued even without knowing the device key; the calibration data will be lost however. The debugger warns you if

it does not know the correct key and asks you to confirm to continue. After a Bulk Erase, the device key is set to the *Main Key* configured below.

All Sectors Erase instructs the debugger to issue individual page erase commands to all flash sectors that need to be reprogrammed. Flash sectors not needed by the program to be loaded are erased if they contain data. The device key cannot be changed, unless the device was using the default key. This option may be faster than *Bulk Erase* if only little changes between download cycles.

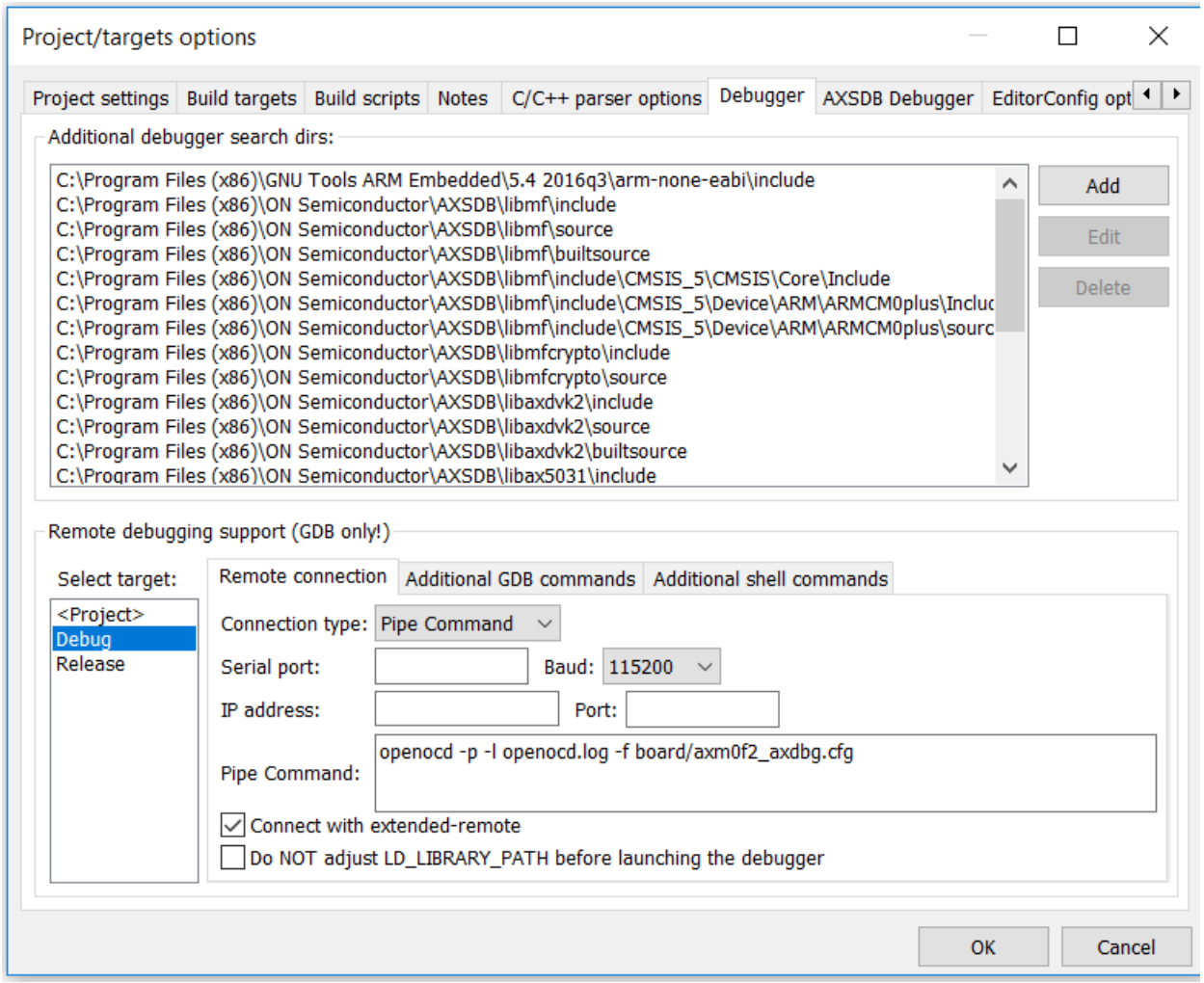
Needed Sectors Erase instructs the debugger to issue individual page erase commands to all flash sectors that need to be reprogrammed. Flash sectors not needed by the program will be left as-is. The device key cannot be changed, unless the device was using the default key. This option may be the fastest if only little changes between download cycles, however left-over contents are not necessarily cleared.

In order to protect the intellectual property of the customer while still allowing full debugging capability, use of the debug interface is protected by a 64 bit key. The debug interface can only be used if the device key is known. The default key (as shipped by ON Semiconductor, and after a bulk erase) is FFFFFFFFFFFFFFFF. *Main Key* specifies the key the debugger should set to protect the debug interface.

Additional Keys lists keys that are tried as well when connecting the device when the main key does not unlock the device. This is useful if multiple projects use different keys, and devices from other projects should be used. If their keys are listed under *Additional Keys*, the debugger will be able to retain the calibration data and reprogram the key to the *Main Key*, when the *Flash Erase Mode* is set to Bulk Erase.

9.2. AXM0F243

The advanced Debugger configuration window can be reached by selecting Project→Properties… from the menu bar, and then clicking on the "Debugger" tab.



For AXM0F243, the programming and debugging happens with the GDB/CDB (GNU) debugger using OpenOCD commands at the background.

10. ONSEMI PROJECT WIZARD

10.1. AX8052

The new project wizard supports the creation of a skeleton project template for AX8052. For AX8052 microcontroller, both SDCC and IAR compilers are fully supported, with selectable code models.

The code structure of the AX8052 example project's main.c looks like this:

```
#if defined(__ICC8051__)
#define coldstart 1
#define warmstart 0
//
// If the code model is banked, low_level_init must be declared
// __near_func elsa a ?BRET is performed
//
#if (__CODE_MODEL__ == 2)
__near_func __root char
#else
__root char
#endif
__low_level_init(void) @ "CSTART"
#else
#define coldstart 0
#define warmstart 1
uint8_t _sdcc_external_startup(void)
#endif
{
   DPS = 0;
   . . .
   GPIOENABLE = 1;
   /* Check for warmstart or coldstart */
   if (PCON & 0x40)
      return warmstart;
   return coldstart;
}
#undef coldstart
```

```
#undef warmstart
#if defined(SDCC)
extern uint8_t _start__stack[];
#endif
void main(void)
{
#if  !defined(SDCC) && !defined(__ICC8051__)
   _sdcc_external_startup();
#endif
#if defined(SDCC)
__asm
G$_start__stack$0$0 = __start__stack
.globl G$_start__stack$0$0
__endasm;
#endif


   . . .
}
```

We need to distinguish the different compilers.

- SDCC

  If available, SDCC arranges for a function named _sdcc_external_startup to be called before main. The return value of this function determines whether static variables should be initialized. The example code uses this to avoid overwriting static variables on a wake-up from sleep.

  Stack: The two ifdefs enclosing _start__stack define a global symbol so that the debugger knows where the stack starts, and can find the call stack.

- IAR

  If available, SDCC arranges for a function named __low_level_init to be called before main. The return value of this function determines whether static variables should be initialized. The function needs to reside in segment CSTART and its calling convention is determined by the code model selected. The example code uses this to avoid overwriting static variables on a wake-up from sleep.

- Keil

  Keil does not call any startup routine, its runtime library does not support bypassing static variable initialization. Therefore, the example code calls it explicitly if the compiler is Keil.

10.2. AXM0F243

The new project wizard supports the creation of a skeleton project template for AXM0F243. For AXM0F243 microcontroller, GNU GCC Compiler for ARM is supported.

The code structure of the AXM0F243 example project's main.c looks like this:

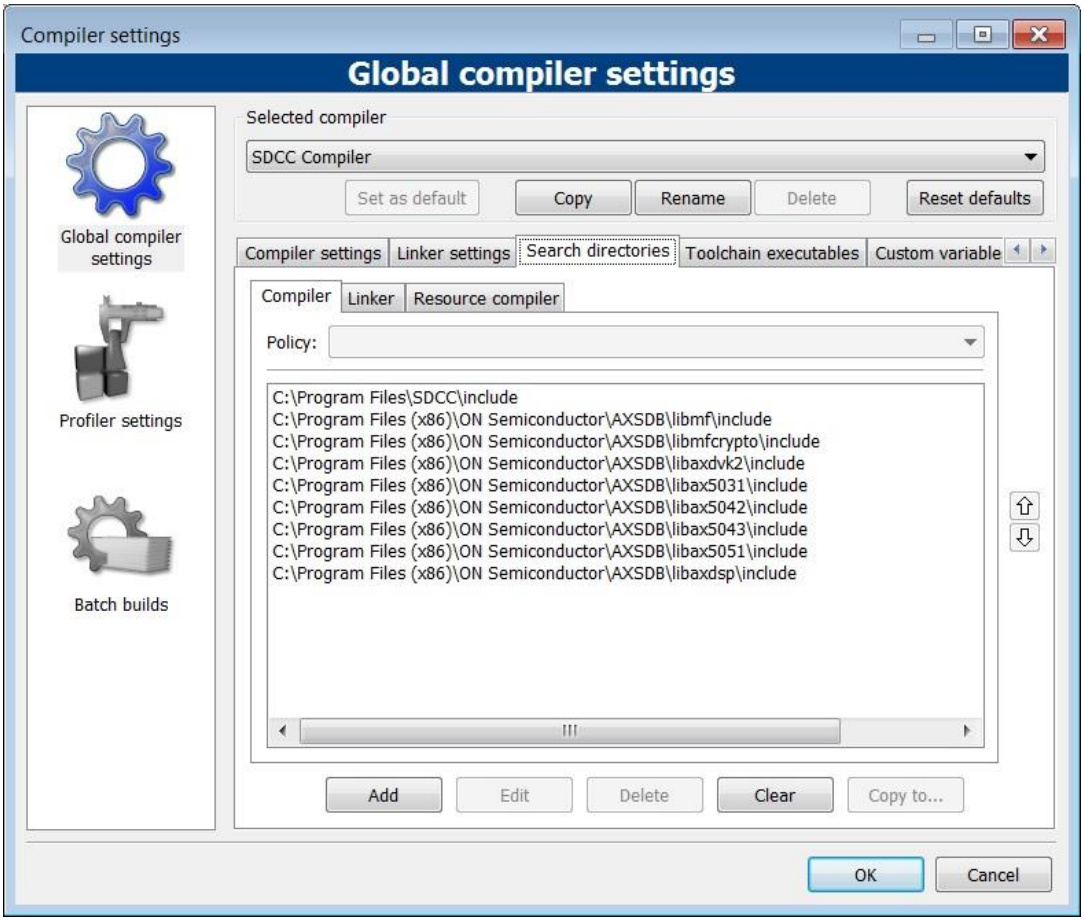
```
#define coldstart 0

#define warmstart 1


uint8_t _axm0f2_external_startup(void)

{

  . . .

  return get_startcause() == STARTCAUSE_COLDSTART ? coldstart : warmstart;

}

#undef coldstart

#undef warmstart

void main(void)

{

   /* Initialize wakeup timer */

   wtimer_init();

   if (get_startcause() == STARTCAUSE_COLDSTART) {

   . . .

   }

   for (;;)

   {

         wtimer_runcallbacks();

         . . .

         uint8_t flg = WTFLAG_CANSTANDBY;

         flg |= WTFLAG_CANSLEEP;

         wtimer_idle(flg);

         . . .

   }


}
```

11. Troubleshooting Guide

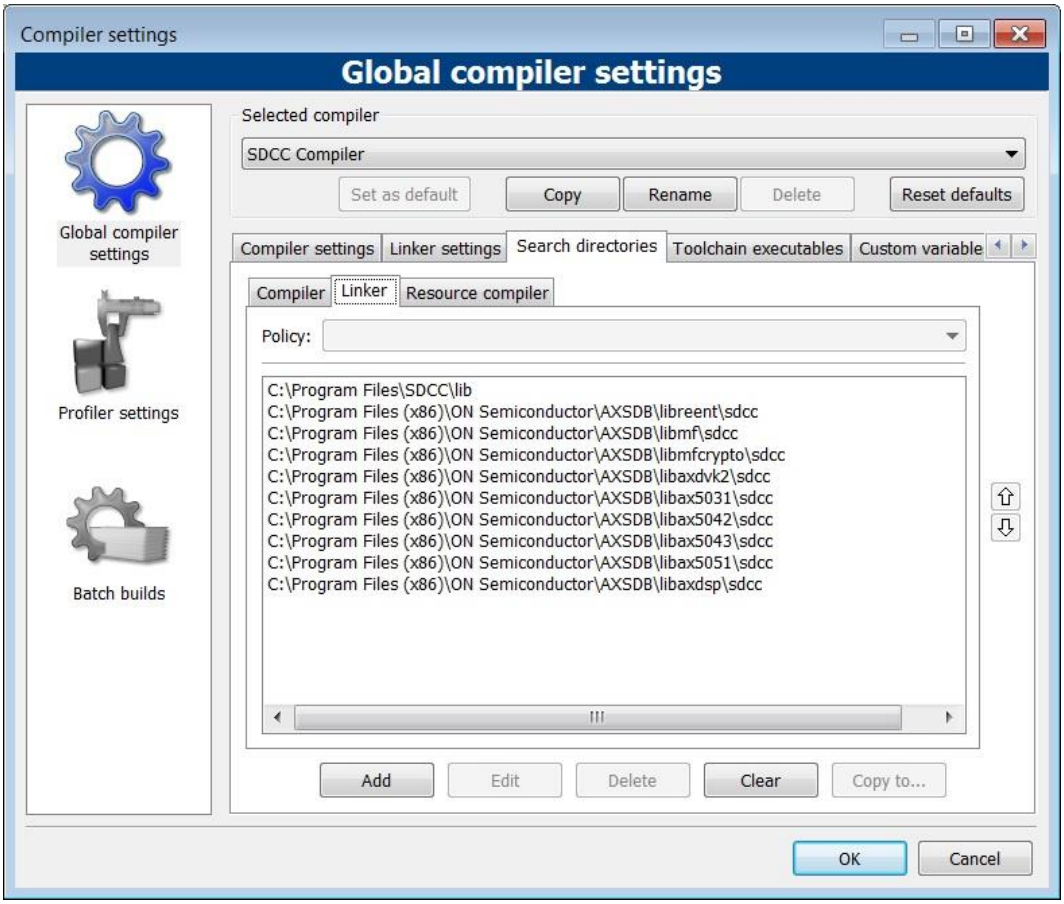
11.1. Compiler Auto-detection fails on first start

AX8052:

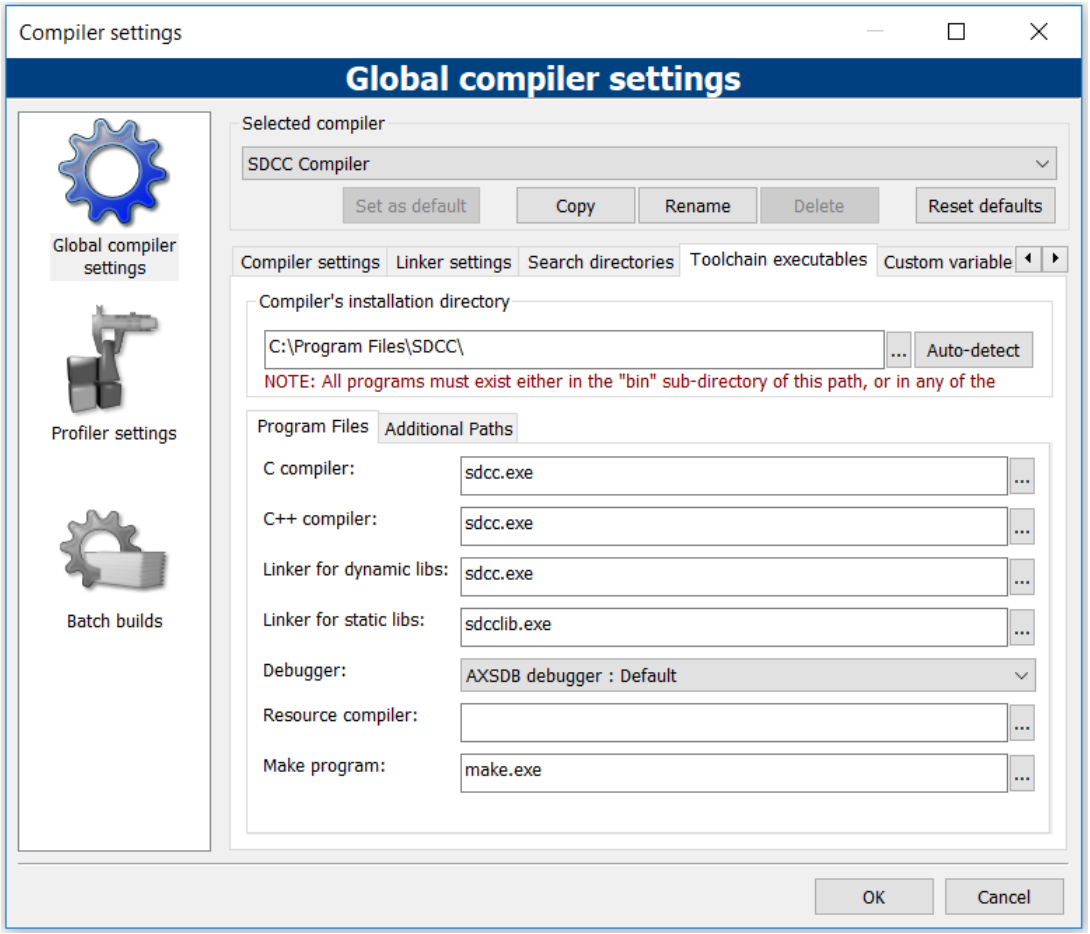
When AxCode::Blocks is run for the first time, it tries to auto-detect the compilers. If the auto-detection fails, configure the compiler (SDCC) for Ax8052 manually as shown in the screen shots below. The path C:\Program Files\ must be replaced by the actual installation path if a non-default installation has been selected.



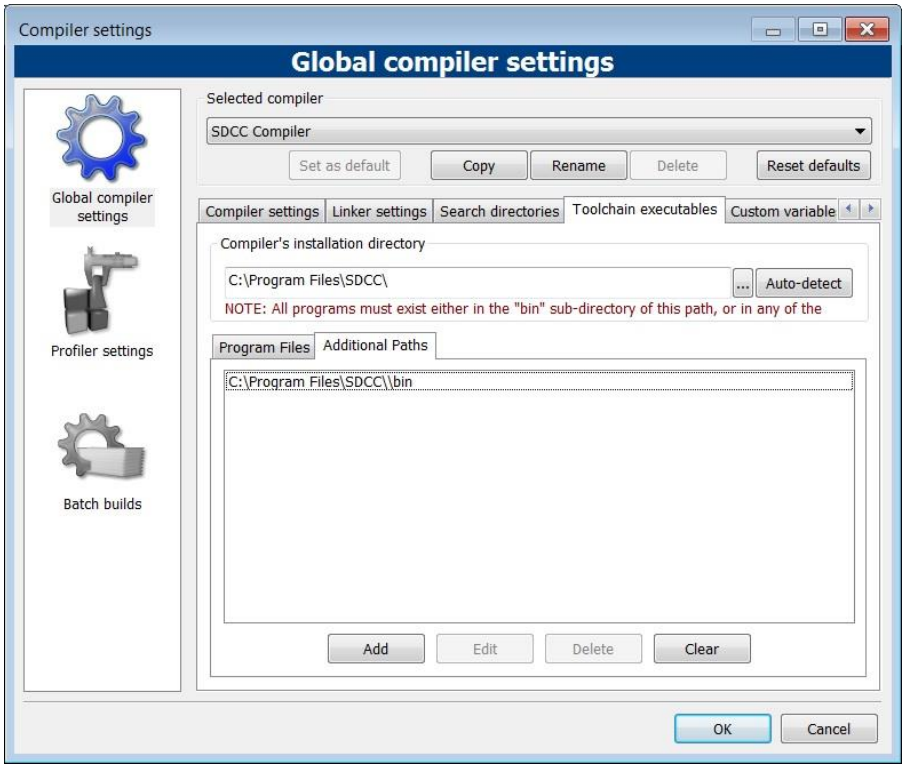
Open the compiler settings dialog by clicking on Settings→Compiler. Select SDCC (under selected compiler). Click on "Set as default". Click on "Search Directories" and "Compiler", and enter the directories as in the picture above.



Click on “Linker”, and enter the directories as in the picture above.



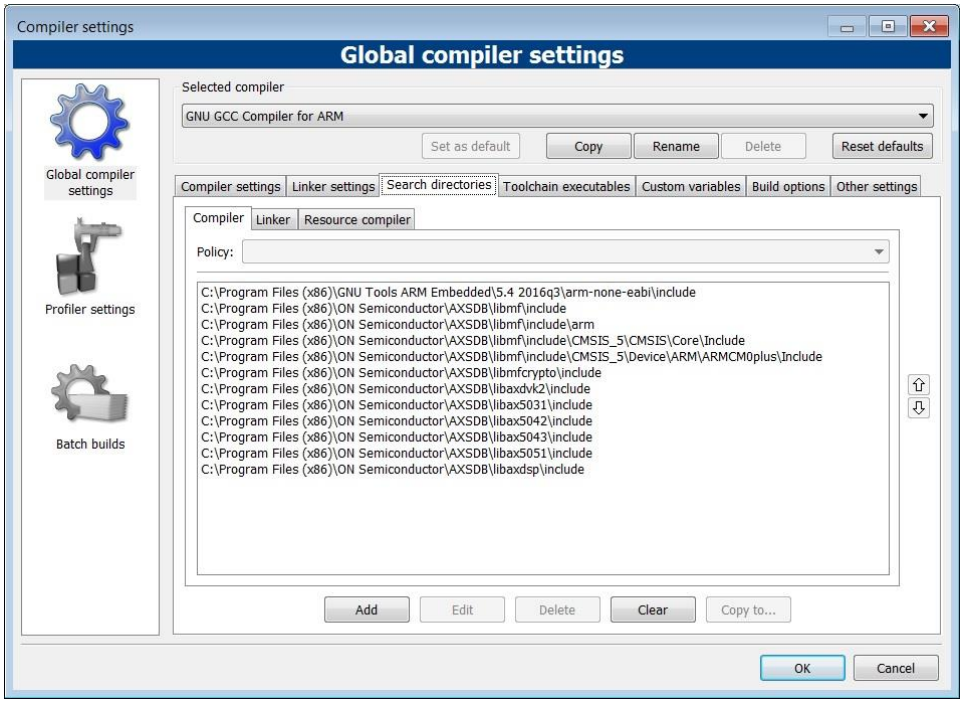
Click on “Toolchain Executables”, and verify the “Compiler's Installation directory”.



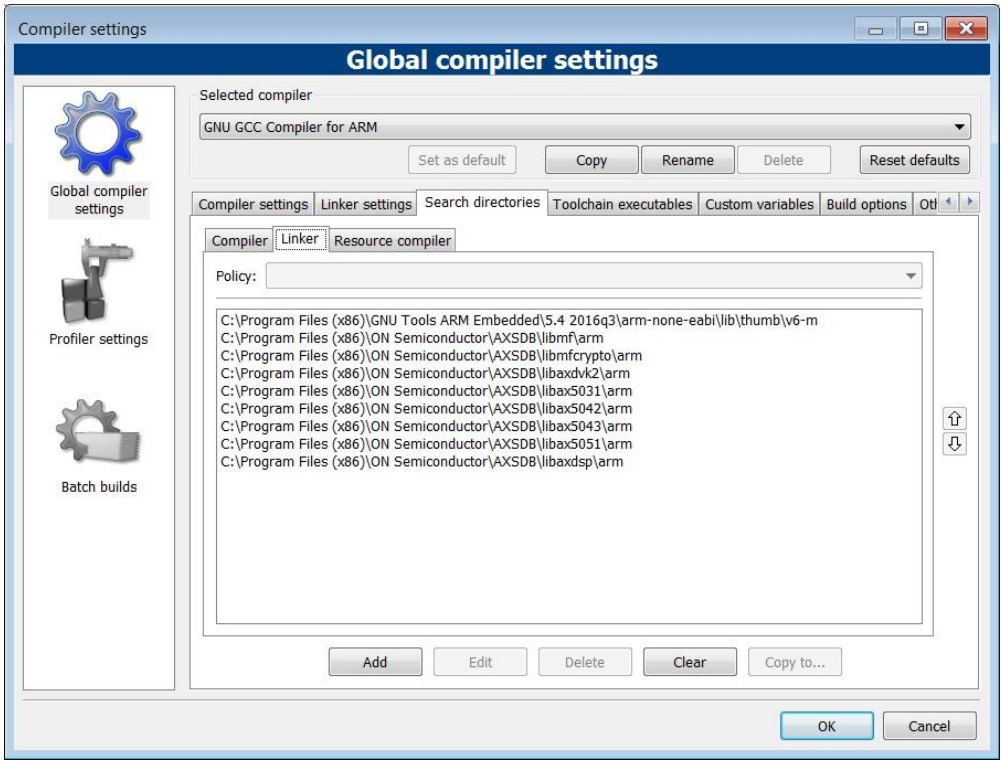
Click on “Additional Paths”, and enter the path as shown above.

AXM0F243:

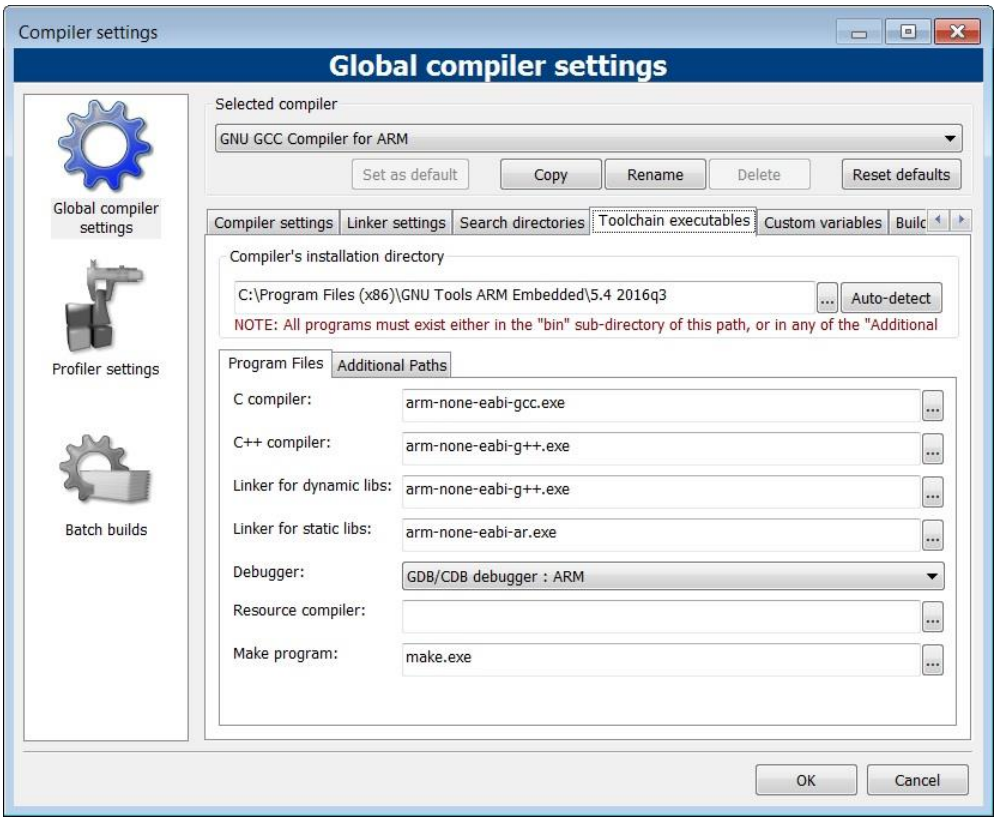
When AxCode::Blocks is run for the first time, it tries to auto-detect the compilers. If the auto-detection fails, configure the compiler (GNU GCC Compiler for ARM) for AXM0F243 manually as shown in the screen shots below. The path C:\Program Files (x86)\ must be replaced by the actual installation path if a non-default installation has been selected.



Open the compiler settings dialog by clicking on Settings→Compiler. Select GNU GCC Compiler for ARM (under selected compiler). Click on "Set as default". Click on "Search Directories" and "Compiler", and enter the directories as in the picture above.



Click on “Linker”, and enter the directories as in the picture above.



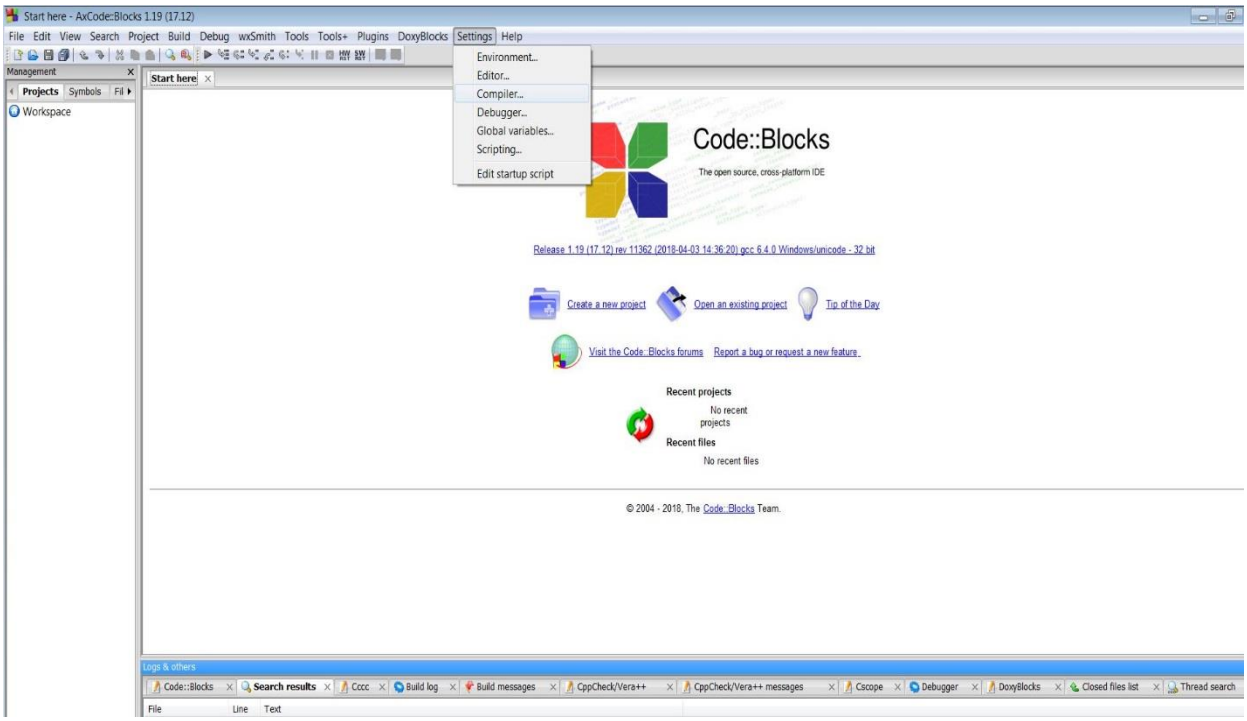
Click on “Toolchain Executables”, and verify the “Compiler's Installation directory”.

11.2. Remove all saved User Settings

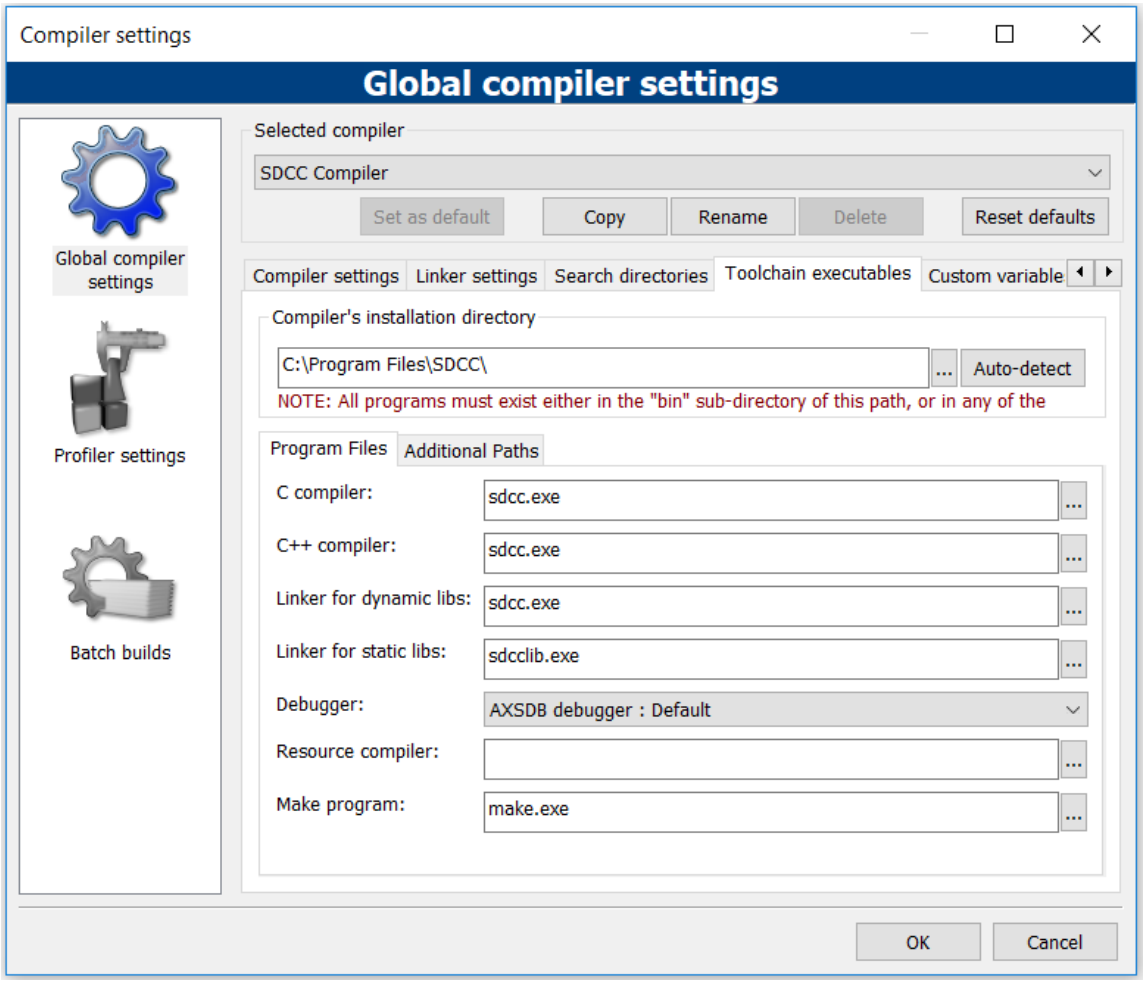
Open an explorer. Type "%APPDATA%" (without double quotes) into the address bar. Type enter. The directory now displayed should contain a folder (subdirectory) named "axCodeBlocks". This is where AxCode::Blocks stores per-user configuration settings. Delete that subdirectory.

11.3. SDCC Project does not compile

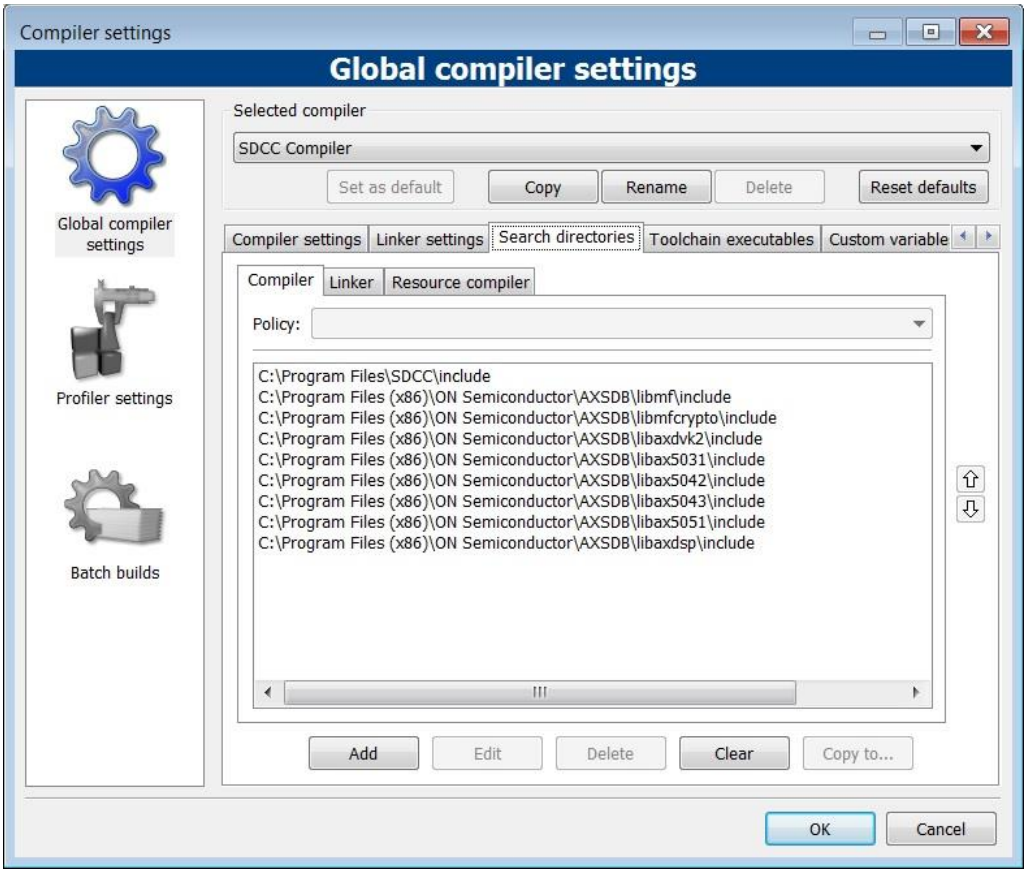
First, make sure that AxCode::Blocks finds the compiler executable. Open the compiler settings window.



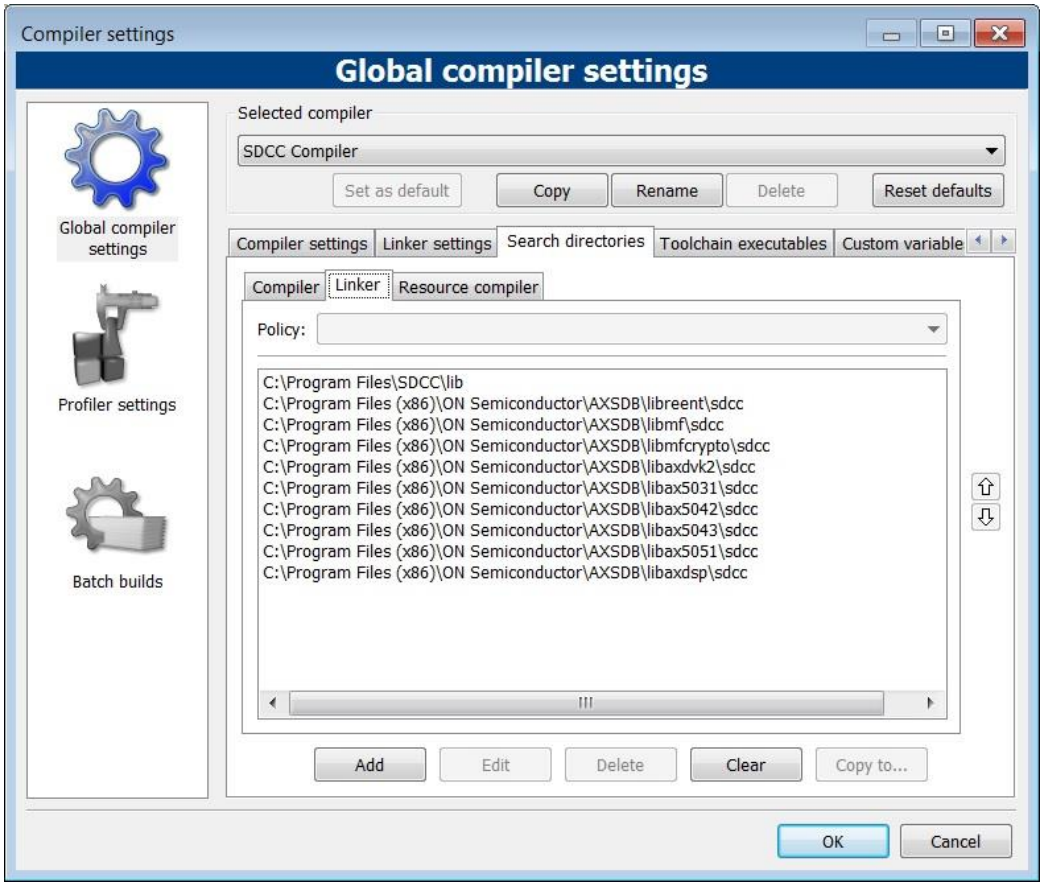
Check that SDCC is the default compiler and that the Compiler's Installation directory points to SDCC's installation location. Normally, this is automatically set up correctly, but if you manually move the SDCC directory, or re-install it at another location, you must manually update the location.



Make sure that SDCC finds all required header files. Check that the compiler's default include paths contain SDCC's own includes, as well as the AX8052 convenience library (such as libmf) includes.



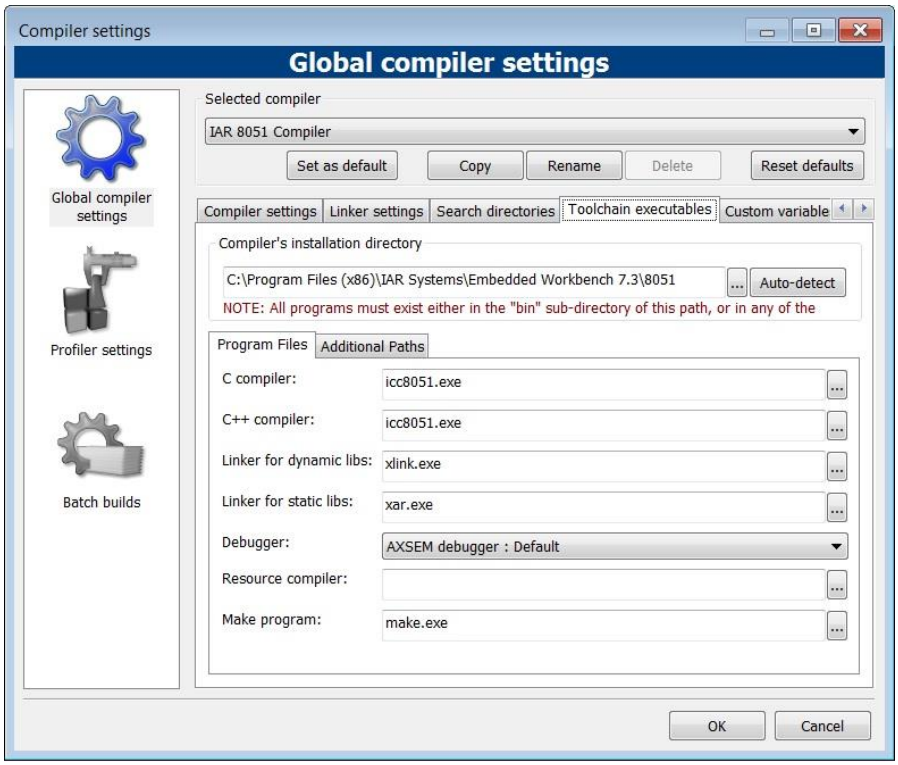
Check that the linker's default paths contain SDCC's own libraries path, as well as the AX8052 convenience library (such as libmf) path.

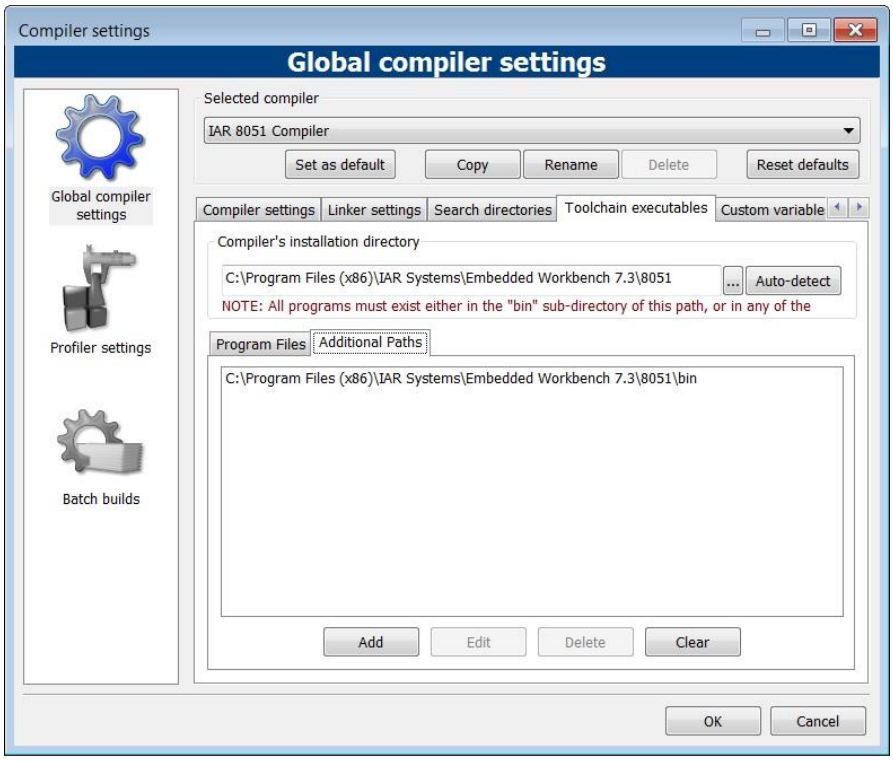


11.4. IAR PROJECT DOES NOT COMPILE

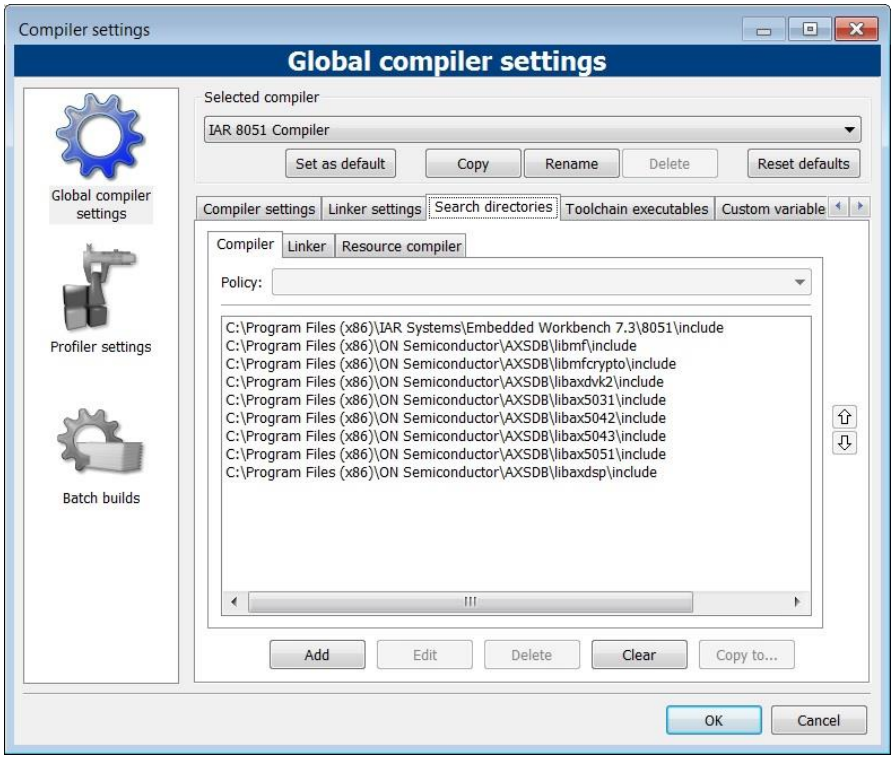
First, make sure that AxCode::Blocks finds the compiler executable. Open the compiler settings window. Then select "IAR 8051 Compiler" in the "Selected Compiler" combobox.

Check that the Compiler's Installation directory points to IAR's installation location. Normally, this is automatically set up correctly, but if you manually move the IAR directory, or re-install it at another location, or update it to a new version, you must manually update the location.

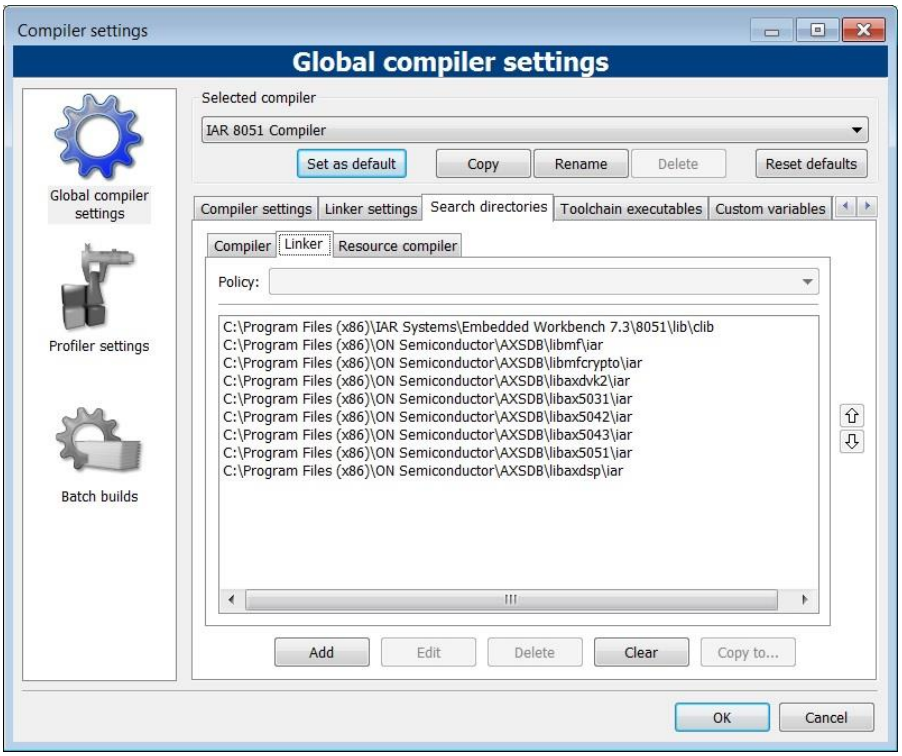




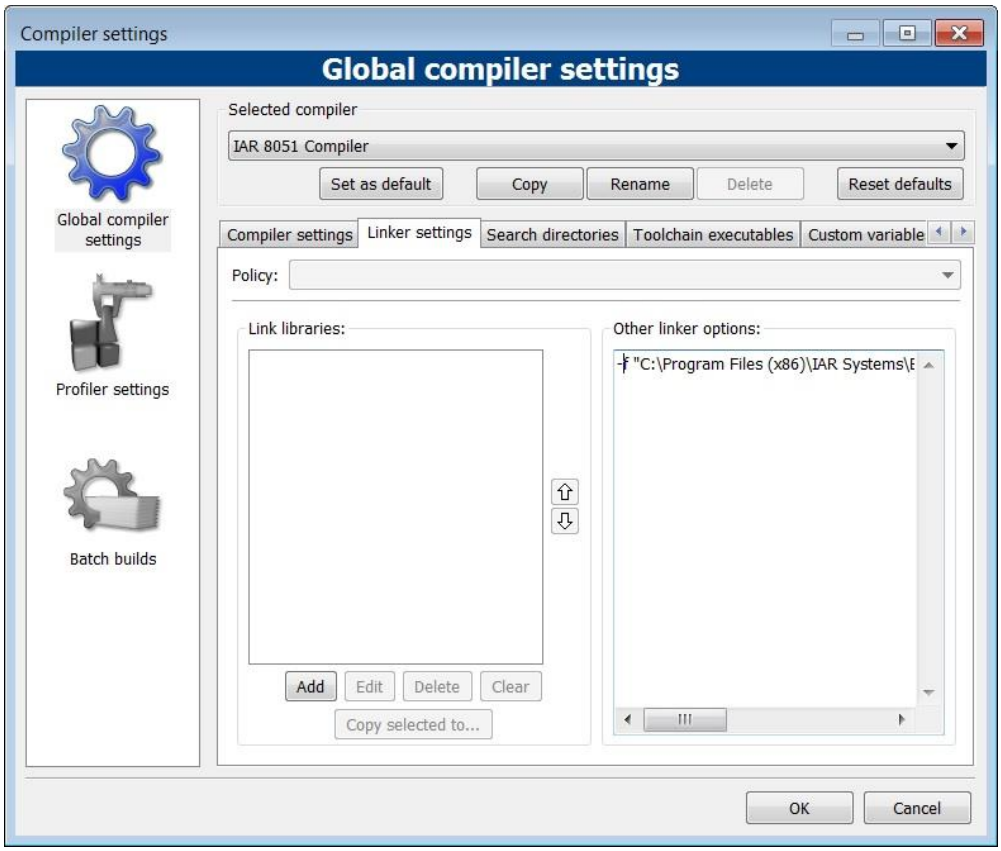
Make sure that IAR finds all required header files. Check that the compiler's default include paths contain IAR's own includes, as well as the AX8052 convenience library (such as libmf) includes.



Check that the linker's default paths contain IAR's own libraries path, as well as the AX8052 convenience library (such as libmf) path.

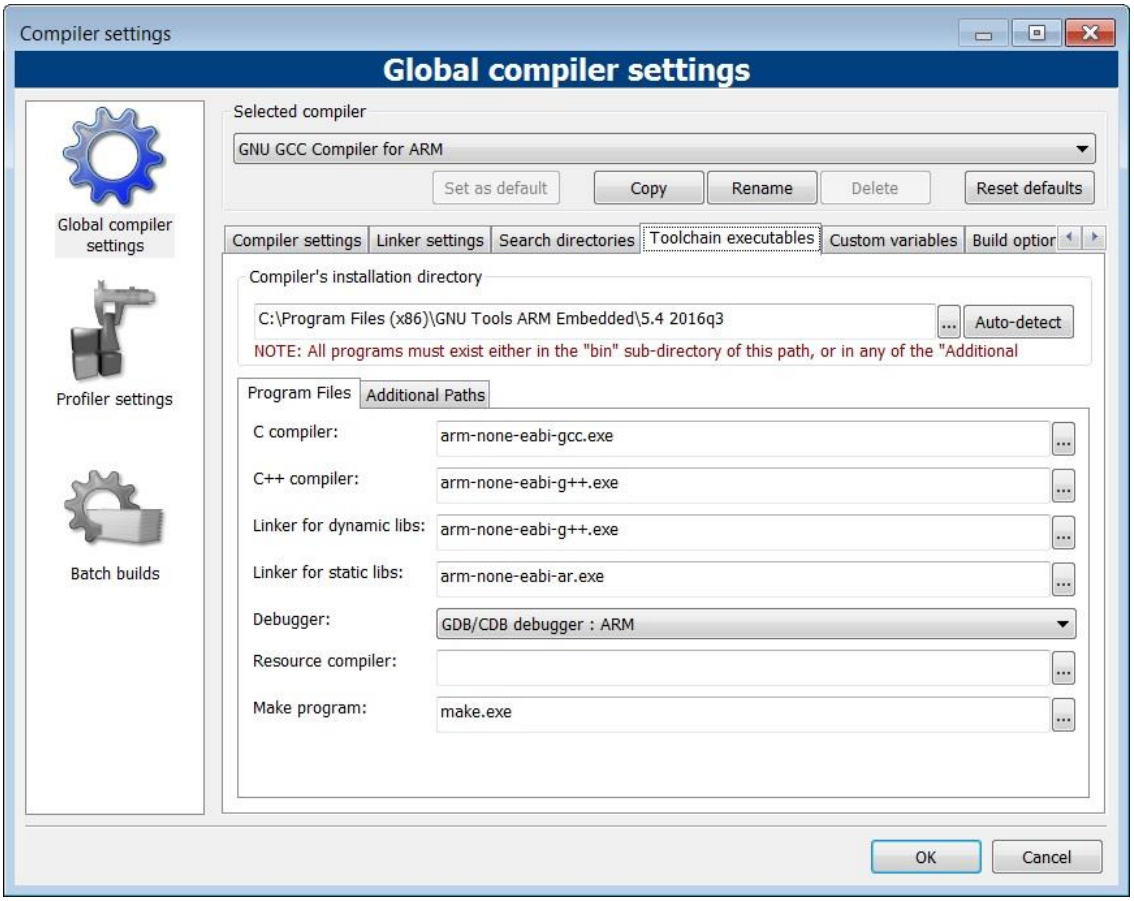


Make sure the correct linker script appears under “Other linker options”; the correct entry is –f "C:\Program Files (x86)\IAR Systems\Embedded Workbench 7.3\8051\config\devices_generic\lnk51ew_plain.xcl"



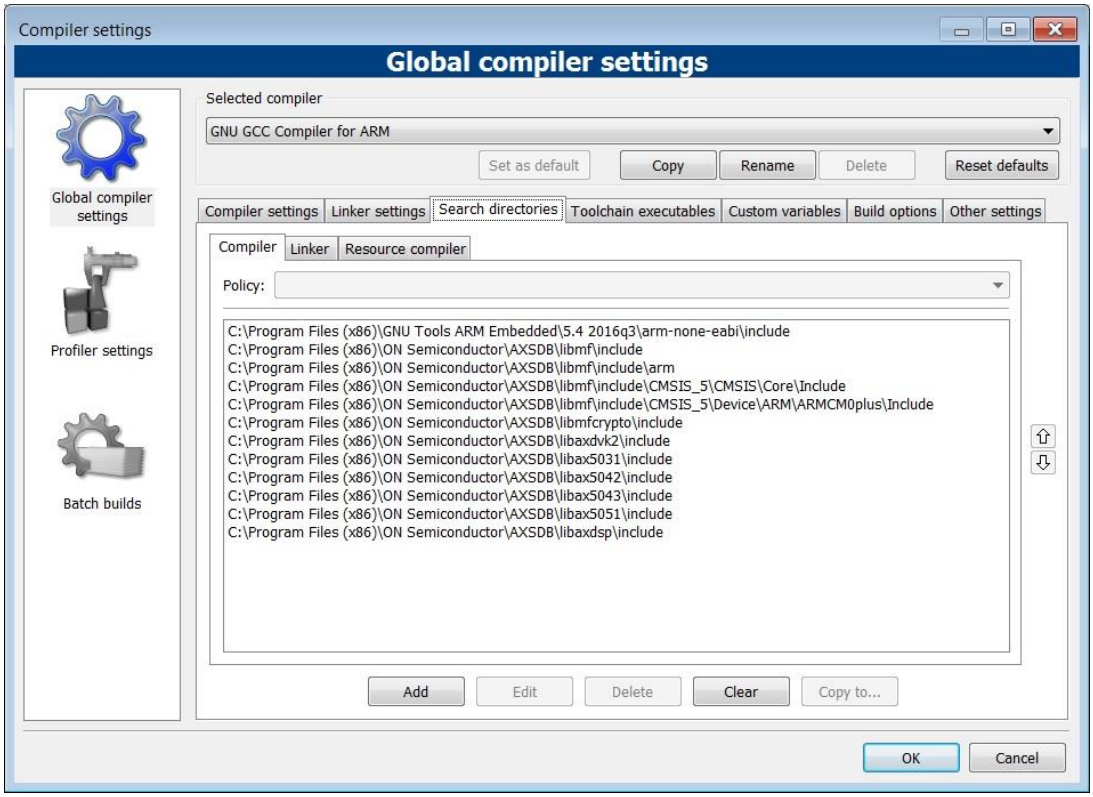
11.5. GCC PROJECT DOES NOT COMPILE

First, make sure that AxCode::Blocks finds the compiler executable. Open the compiler settings window. Then select "GNU GCC Compiler for ARM" in the "Selected Compiler" combobox.

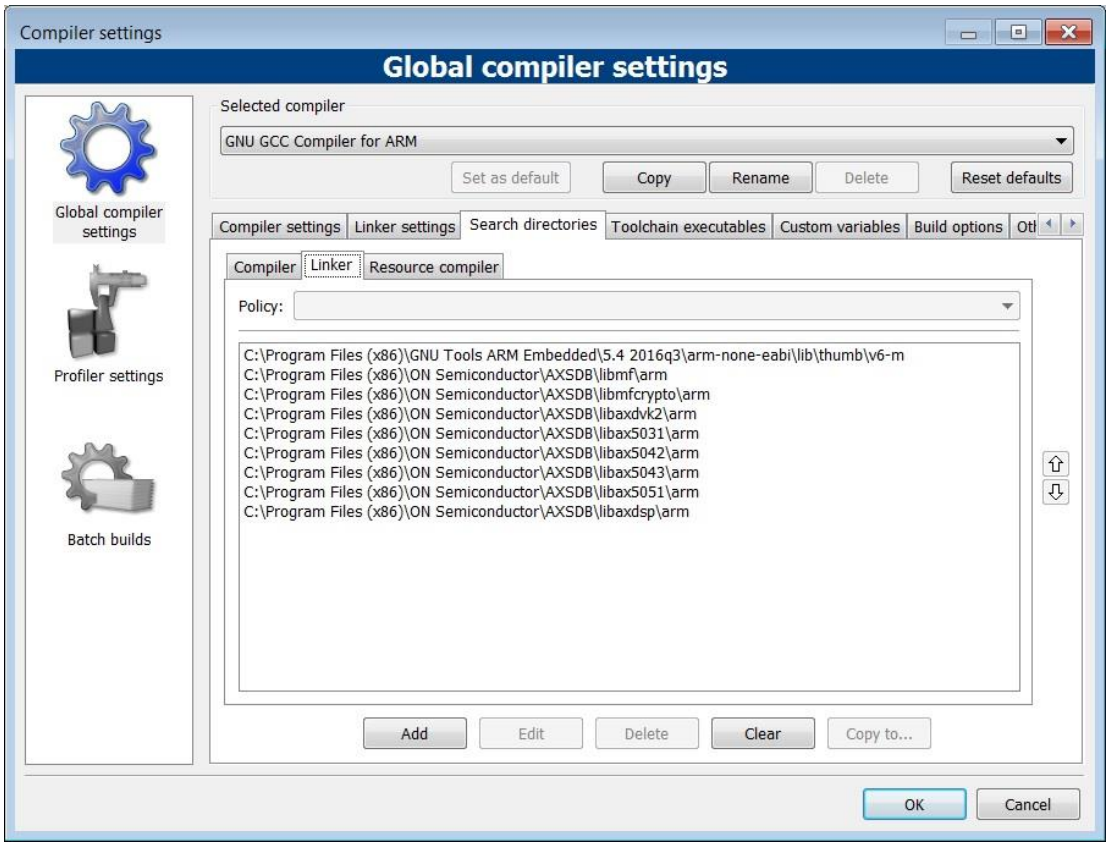


Check that GNU GCC Compiler for ARM is the default compiler and that the Compiler's Installation directory points to compiler's installation location. Normally, this is automatically set up correctly, but if you manually move the compiler directory, or re-install it at another location, you must manually update the location. Also make sure that the compiler's installation location is available in the system path. If it's not available, add the same to the system path.

Make sure that GCC compiler finds all required header files. Check that the compiler's default include paths contain GCC compiler's own includes, as well as the AXM0F243 convenience library (such as libmf) includes.

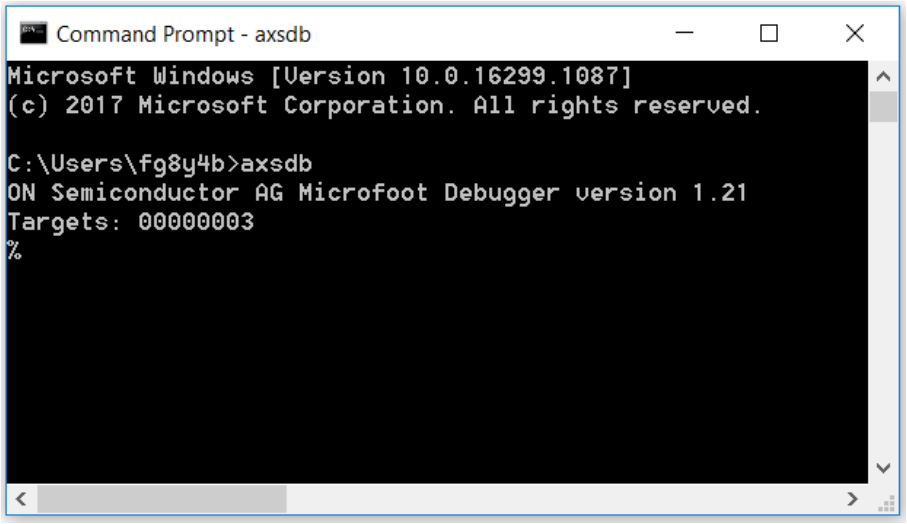


Check that the linker's default paths contain GCC compiler's own libraries path, as well as the AXM0F243 convenience library (such as libmf) path.



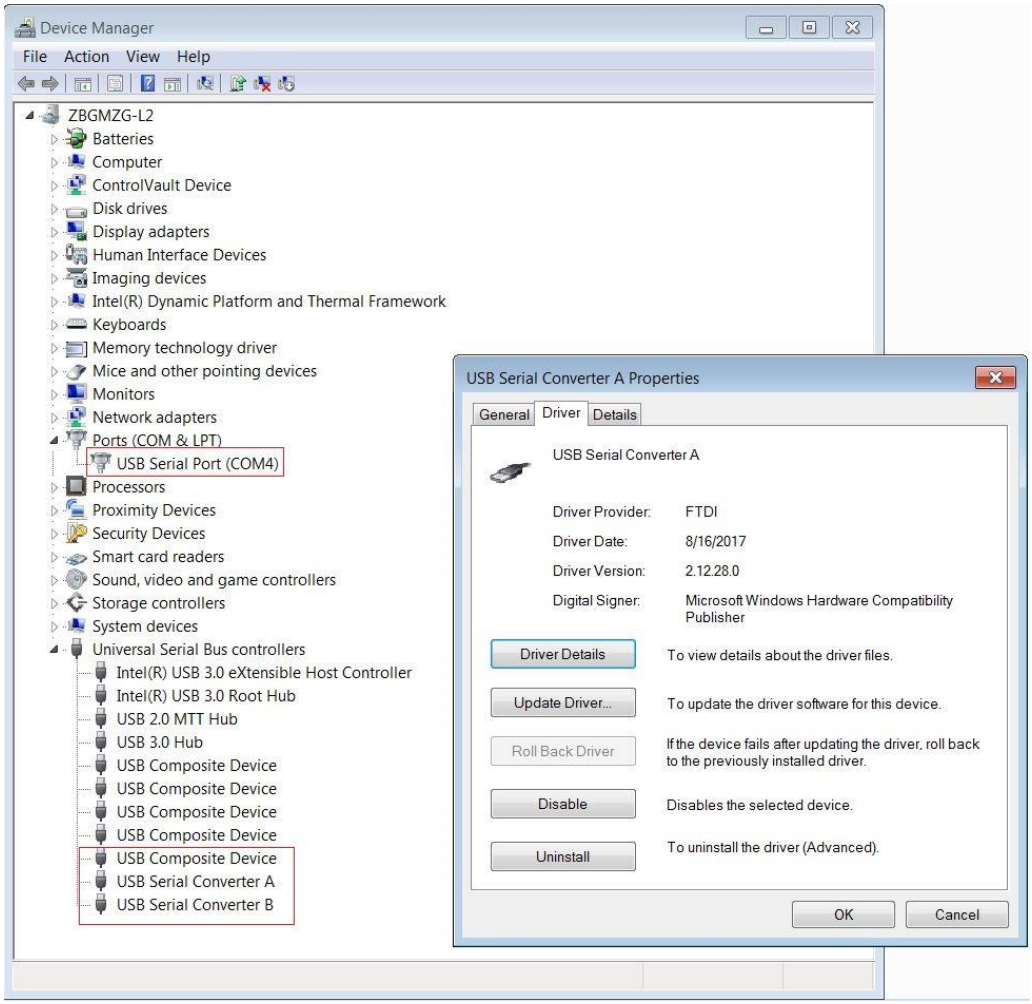
11.6. PROJECT COMPILES, BUT DEBUGGING DOES NOT WORK

First check whether the ON Semiconductor Command Line Debugger, AXSDB, works. Start AXSDB (the installer places a link into the program section of the start menu).

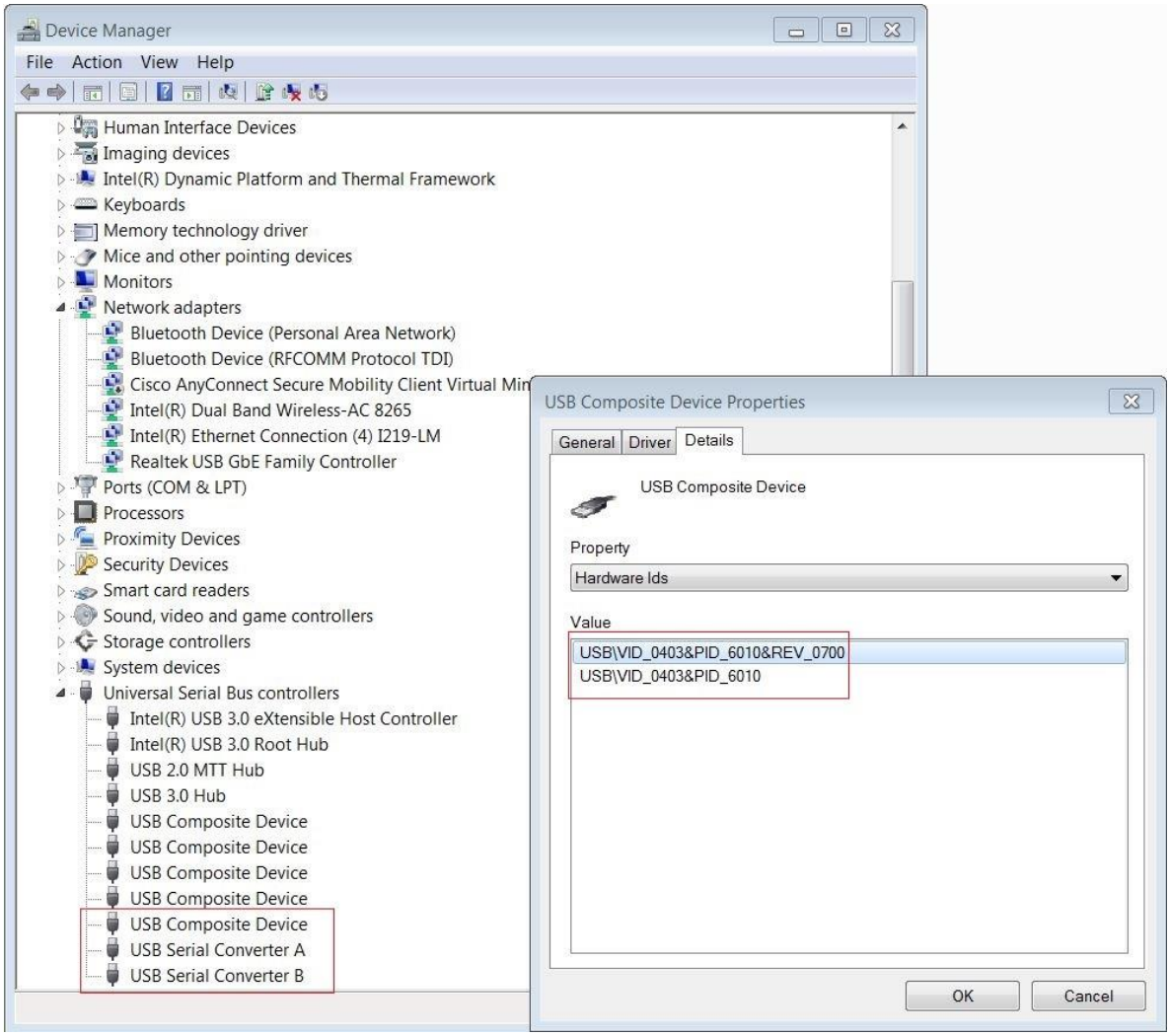


AXSDB should print the serial number of a target after the "Targets:" prompt. The top two reasons for an empty line after "Targets:" are that no debug adapter is connected to a working USB port, or that the USB drivers have not been correctly installed.

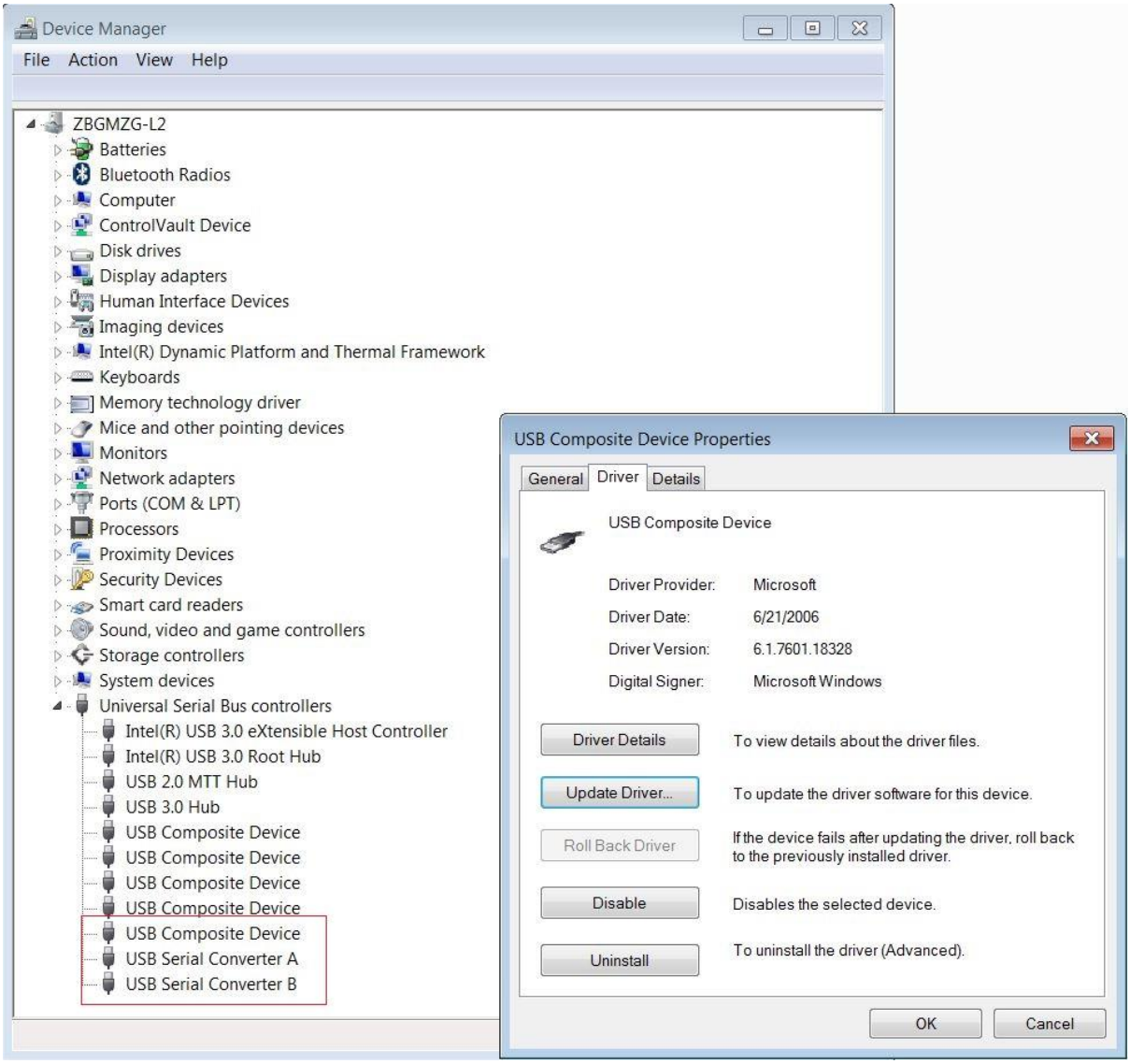
To check whether the drivers are correctly installed, open the device manager (The driver installation is common for both AX8052 and AXM0F243)



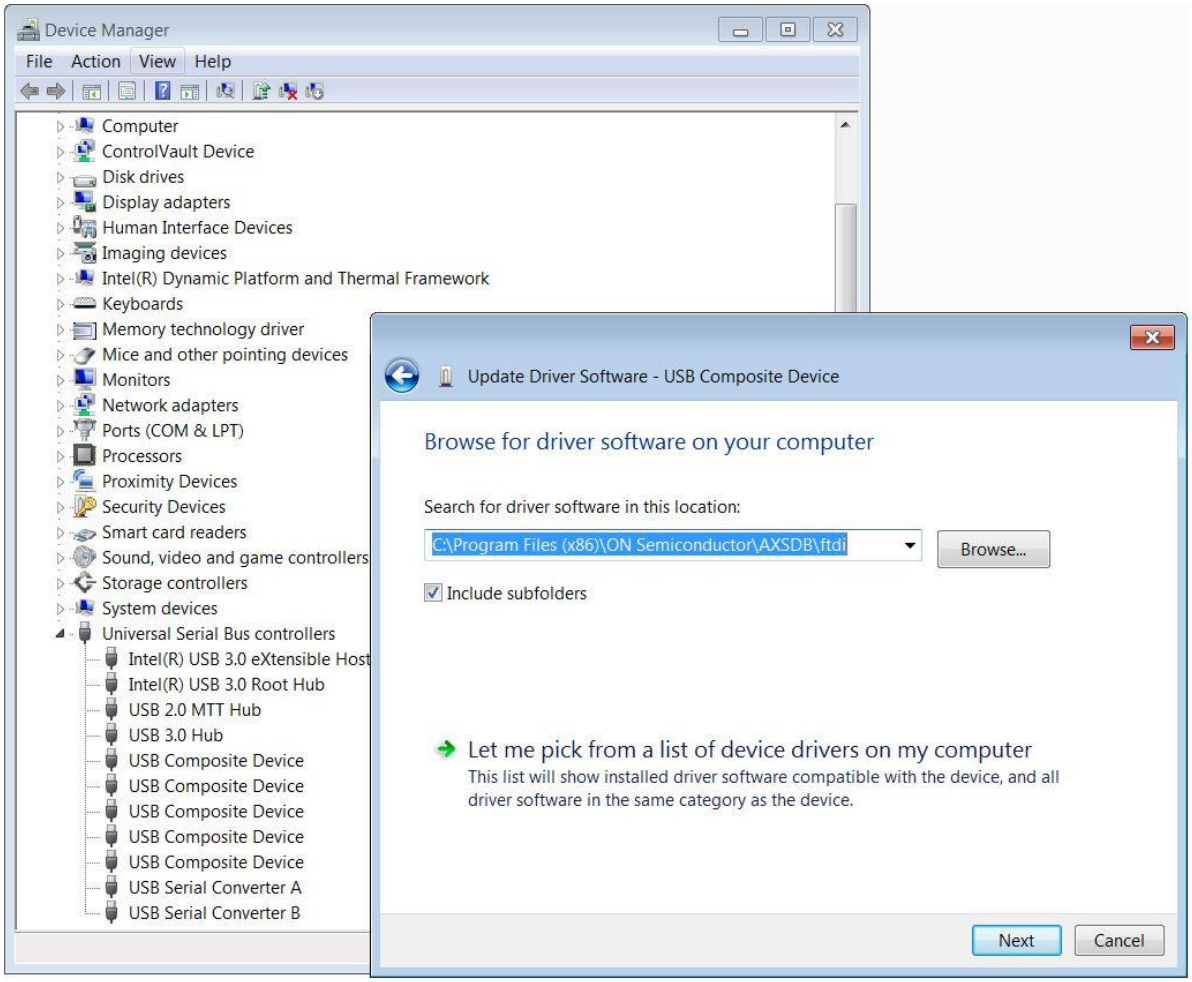
For the AXDBG debug adapter USB device, the Vendor ID (VID) is 0403 and the Product ID (PID) is 6010 as shown below.



If the drivers are not correctly installed, there will be a yellow exclamation marks on “USB Serial Converter A” or “USB Serial Converter B” or “USB Composite Device” which indicates that the driver has not been correctly installed. Right-click on the device with the exclamation mark, and choose Update driver.



Newer Versions of Windows, if connected to the internet, offer the option to search Windows Update for a suitable driver. You can choose this option; it is the easiest option, though may take some time. As an alternative, the installer also puts suitable drivers into C:\Program Files (x86)\ON Semiconductor\AXSDB\ftdi. You can choose to install from this directory and its subdirectories as well.



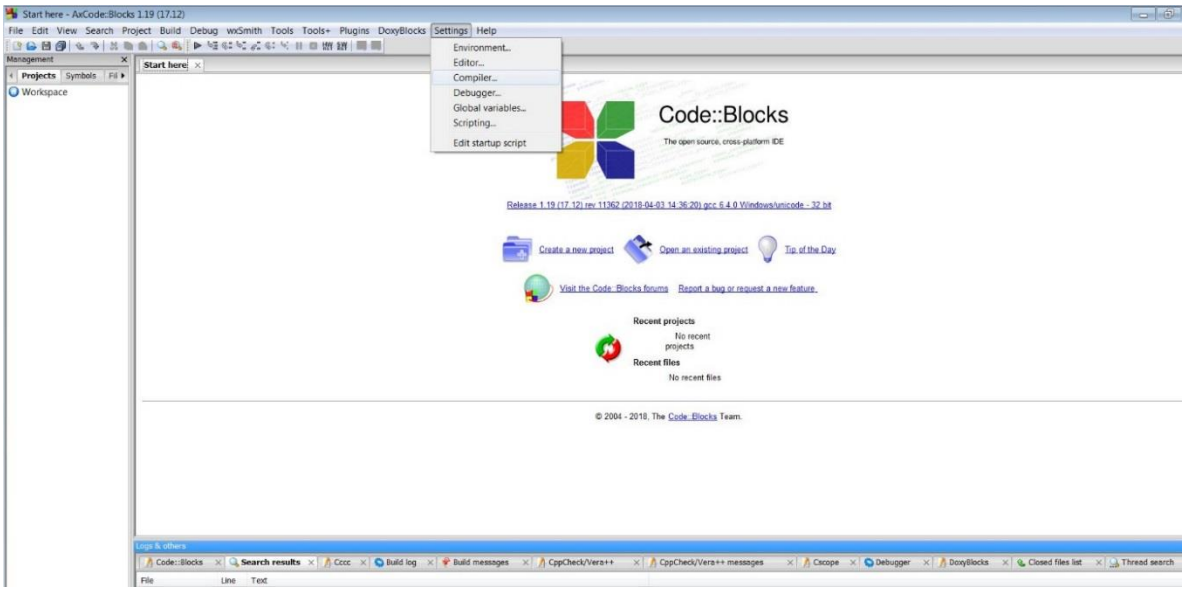
After successfully re-installing the drivers, there should not be any yellow exclamation marks on “USB Serial Converter A” or “USB Serial Converter B” or “USB Composite Device”. After installing the drivers, you should reboot Windows.

Check that AXSDB now recognizes the target.

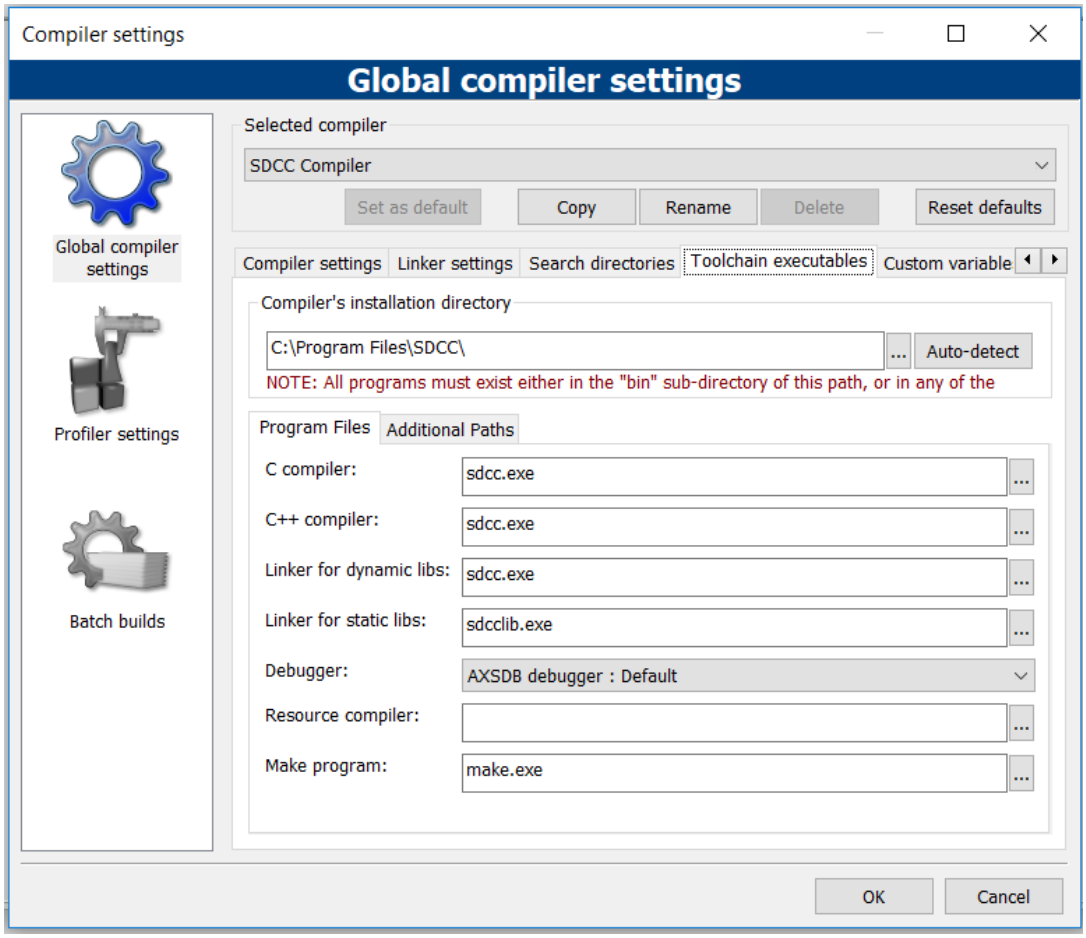
AX8052:

If the debugger plugin is not correctly configured, see below for how to configure it for AX8052 microcontroller.

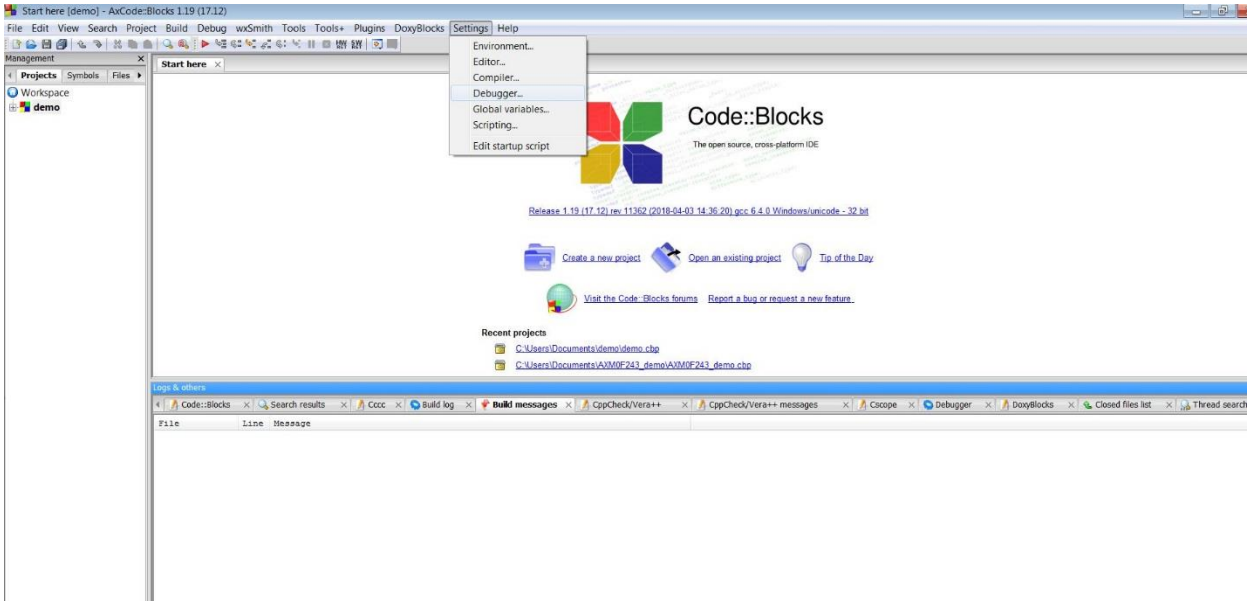
Start AxCode::Blocks. Verify that the correct debugger plugin is selected. To do this, open the compiler settings window.



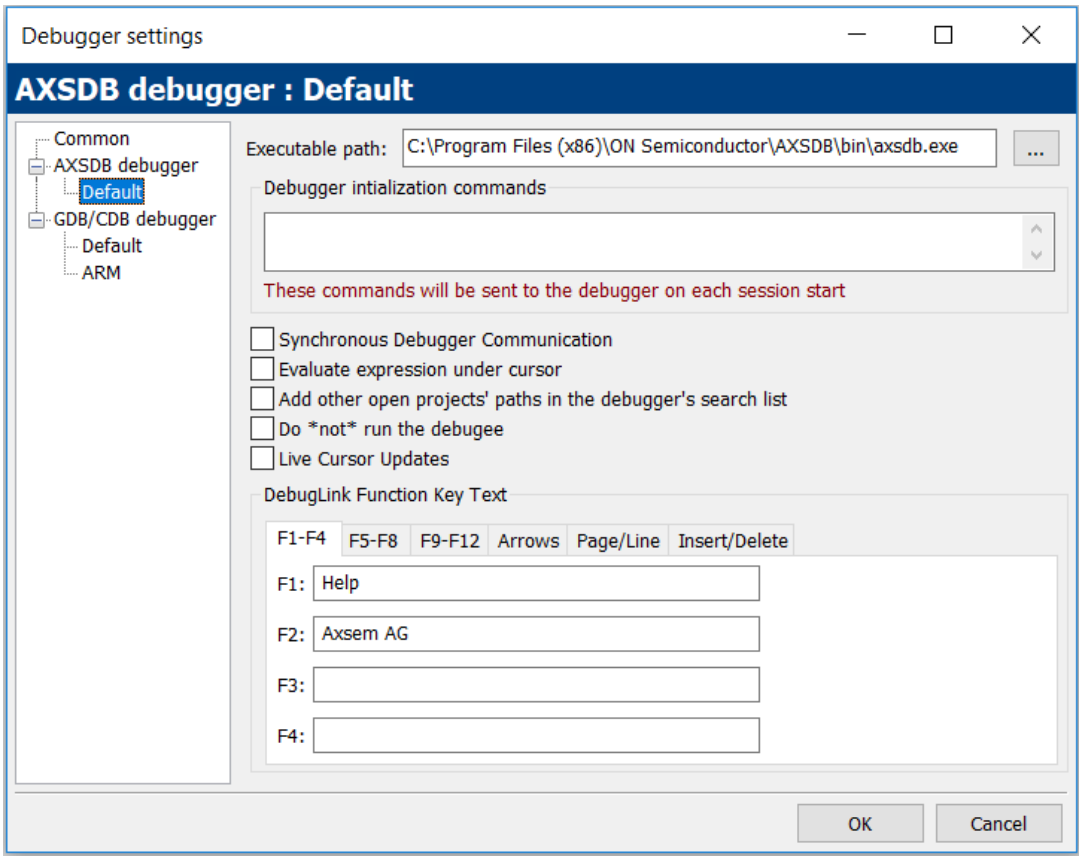
Check that the debugger plugin named "AXSDB debugger: Default" is selected.



Now check that the correct axsdb binary is configured in the plugin configuration. To do this, open the debugger settings.



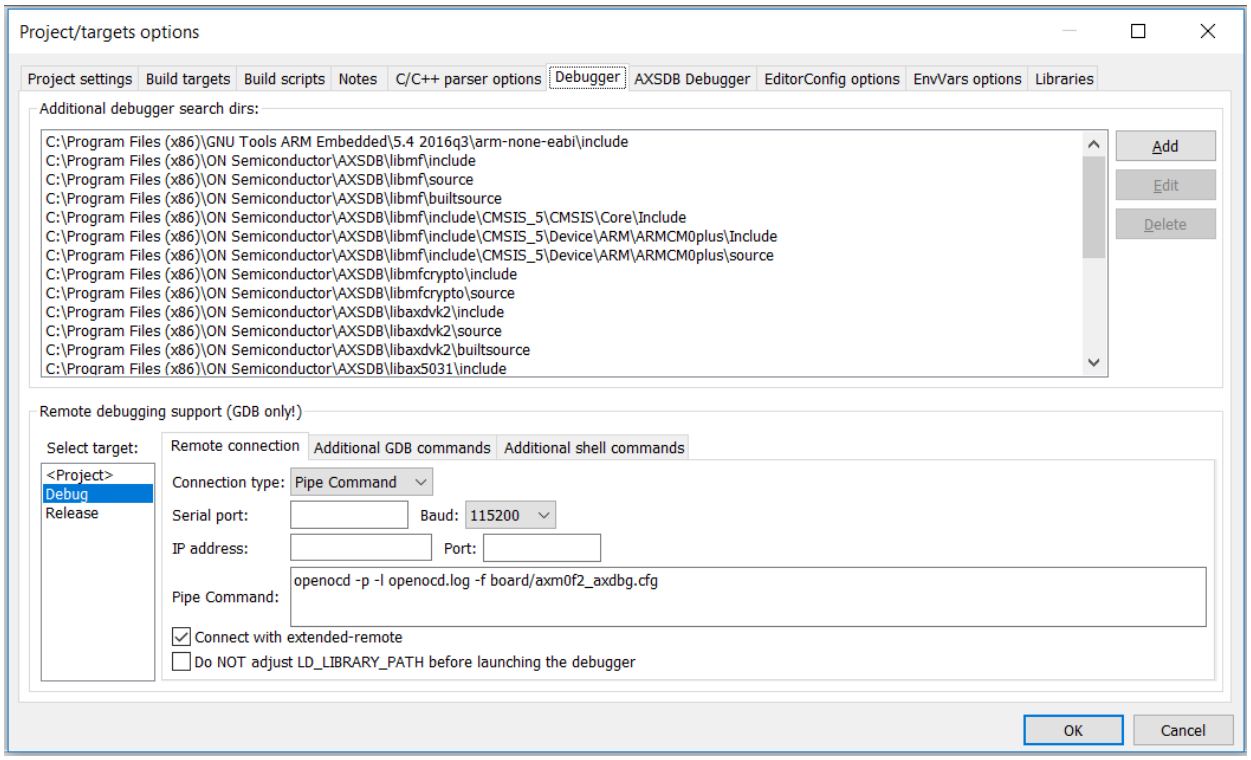
Select AXSDB debugger – default. Check that the Executable path is correct.



AXM0F243:

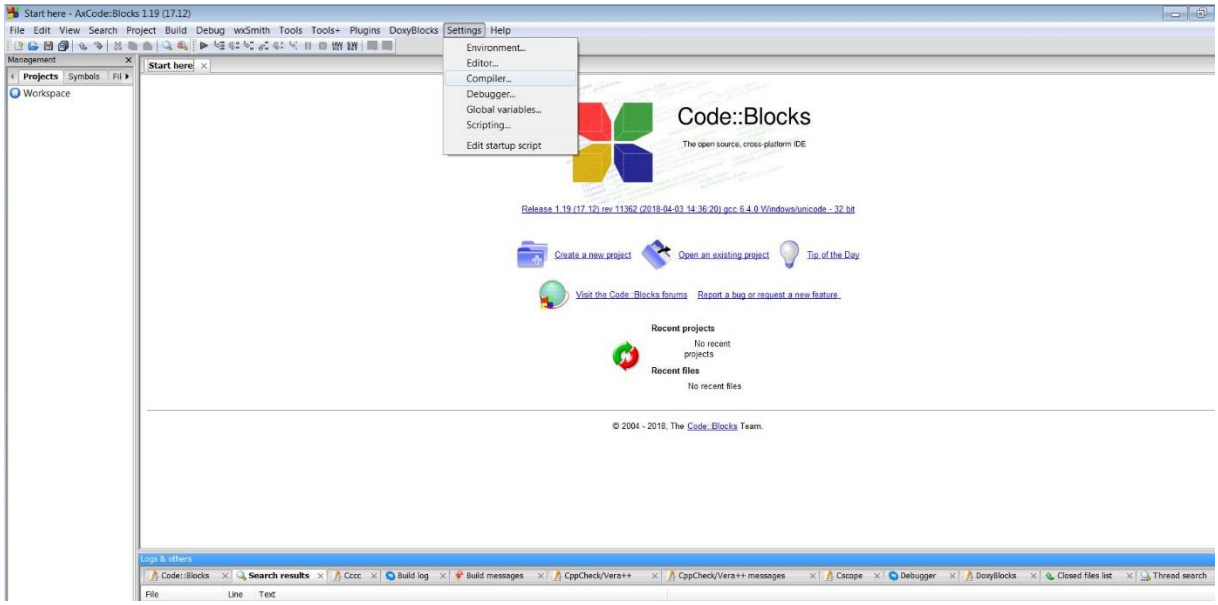
Check that the OpenOCD.exe debug interface software is available in the installation directory where the you have installed the AXSDB followed by "\bin" ("C:\Program Files (x86)\ON Semiconductor\AXSDB\bin")

Make sure that the name of the configuration file (.cfg) and the path to the file is given correctly. By default, the configuration file for AXM0F243 microcontroller is available in the directory "C:\Program Files (x86)\ON Semiconductor\AXSDB\share\openocd\scripts\board"

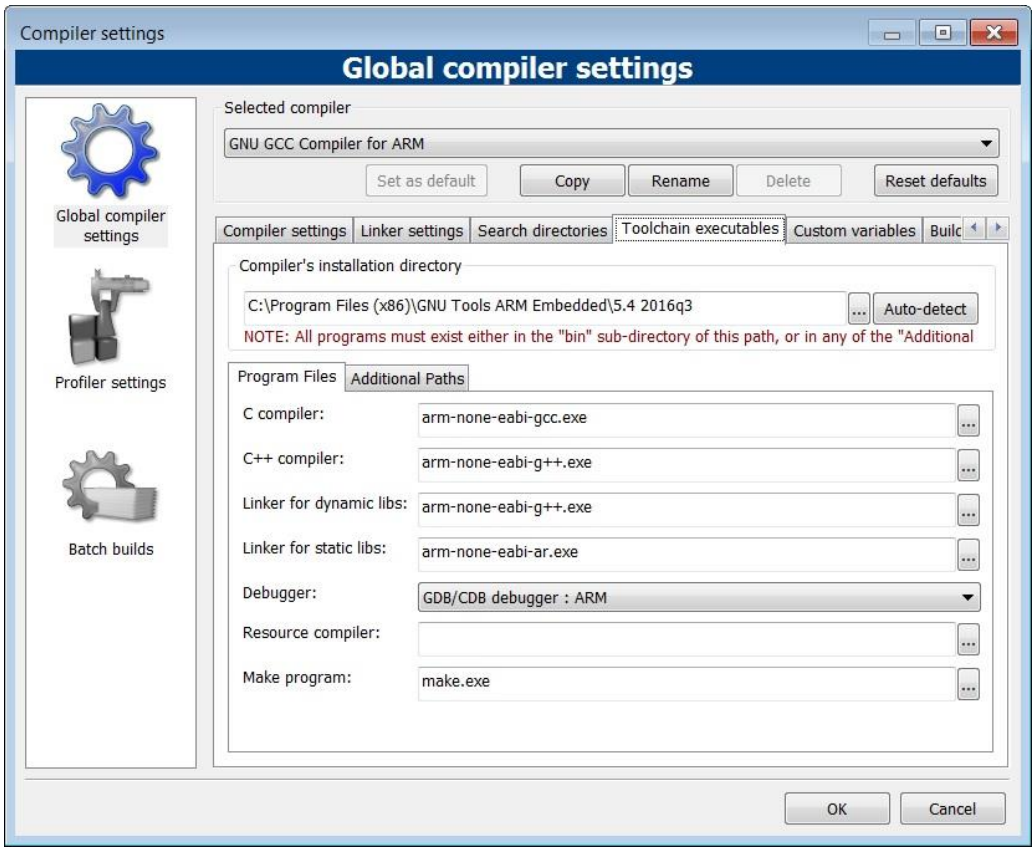


If the debugger plugin is not correctly configured, see below for how to configure it for AXM0F243 microcontroller.

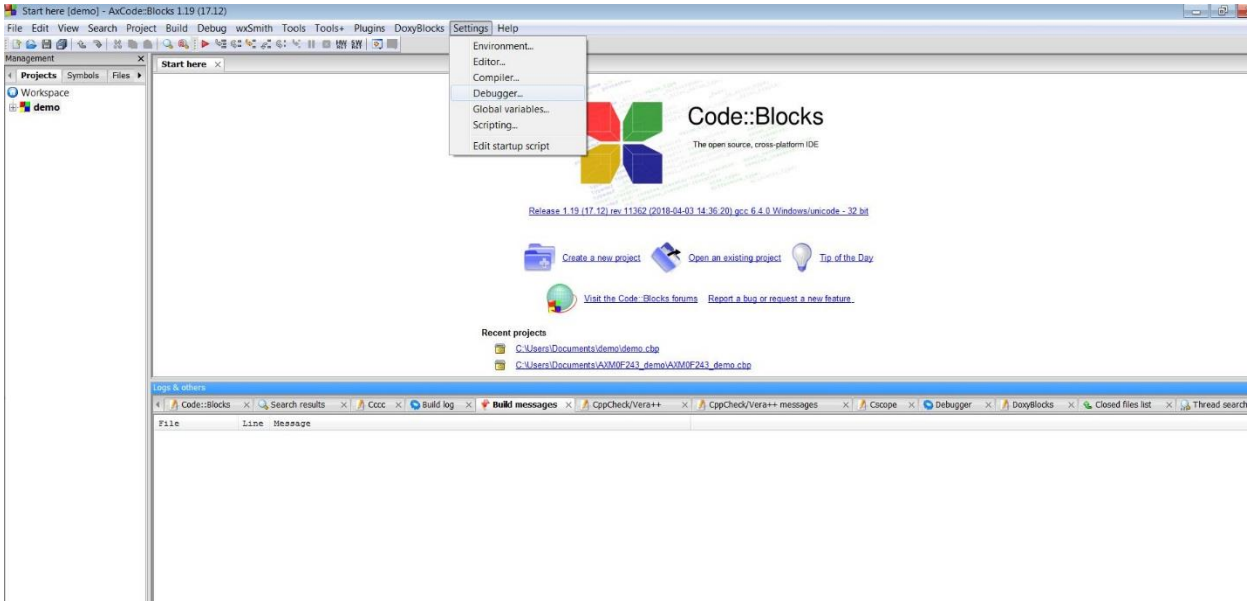
Start AxCode::Blocks. Verify that the correct debugger plugin is selected. To do this, open the compiler settings window.



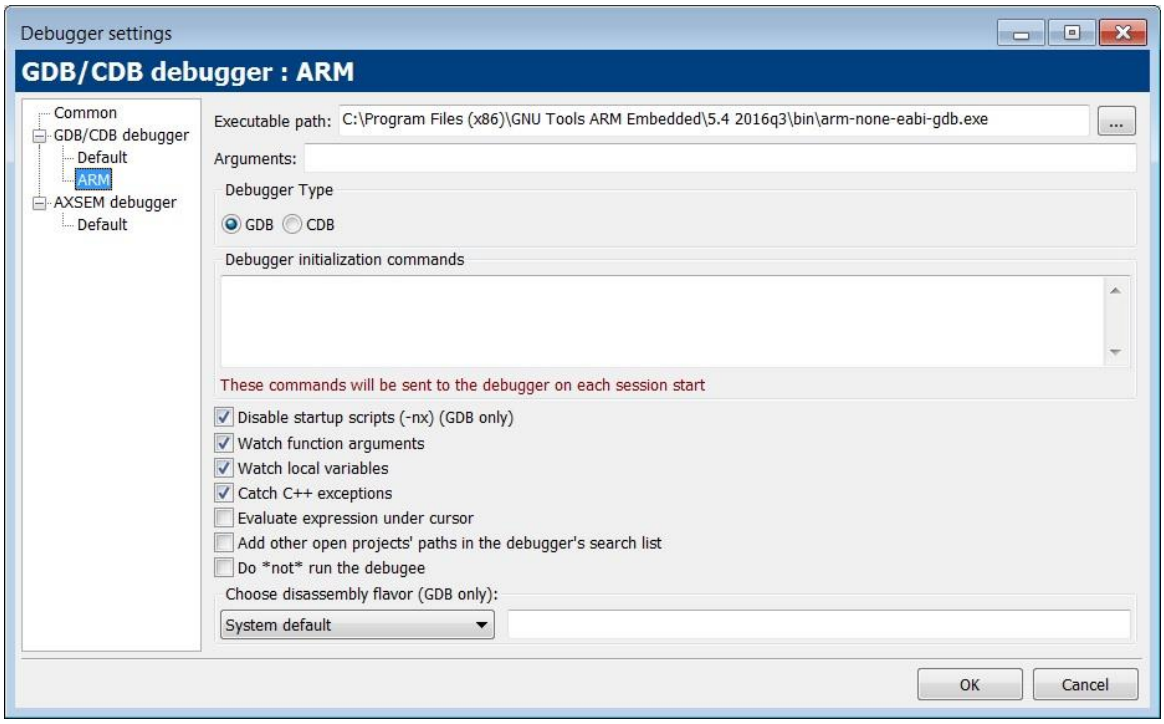
Check that the debugger plugin named "GDB/CDB debugger : ARM" is selected.



Now check that the correct binary is configured in the plugin configuration. To do this, open the debugger settings.



Select GDB/CDB debugger: ARM. Check that the Executable path is correct.



12. HISTORY

Version	Date	Comments
1.00	28-Aug-18	Draft version
1.01	28-Aug-18	Added AX8052 and AXM0F243 details
1.02	24-May-19	Updated section 7.3 Open OCD commands details

13. Contact Information

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