



Software Application Note

ams firmware projects for Microchip PIC24F MCUs

1 General Description

This application note describes how to compile firmware source code projects based on Microchip PIC24F MCUs. Ams typically provides a Makefile project and a MPLABX project with the firmware source code deliverables.

2 Toolchain requirements

This section describes the required tools which must be installed to build the firmware source code projects.

2.1 Microchip Compiler

The compiler is required for Makefile- and MPLABX-projects as well. Our firmware projects are currently developed and tested using the following compiler:

Compiler: Microchip C30 Compiler v3.31

Version: Output of command "pic30-gcc.exe -v"

```
gcc version 4.0.3 (dsPIC30, Microchip v3_31) Build date: Oct 27 2011
Microchip Language Tool Shell Version v3_31 (Build date: Oct 27 2011).
Copyright (c) 2006 Microchip Technology Inc. All rights reserved
```

The compiler installer is available on the Microchip website:

http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1406&dDocName=en535364

We recommend the following installation folder for the C30 compiler:

C:\MPLABC30

When the compiler is run w/o a valid license, the feature set of the compiler is reduced. Please refer to the Microchip website for details on compiler licensing.

2.2 Makefile projects

2.2.1 Cygwin environment installation

Ams uses Cygwin to build Makefile-based project on command line. Cygwin provides a Linux look and feel environment for Windows. Documentation and free download are available at

<http://www.cygwin.com/>

During the setup of the Cygwin environment you can select the modules which should be installed with your setup. Please select the following packages which are required for a build of ams firmware projects on command line level.

- Devel -> binutils
- Devel -> make

2.2.2 Windows Environment Variable Setup

After installation, you need to add the following environment variable to your system settings:

Name: c30dir

Value: <installation folder of C30 compiler, e.g. C:\MPLABC30>

2.2.3 Build firmware projects on command line

To build on command line, you need to do the following:

1. Open a Cygwin shell
2. Change directory into the folder where the Makefile is located
3. Enter command "make clean all" to build the project

During build, the following files are generated in folder build

- build/<projectname>.cof ... binary file
- build/<projectname>.hex ... HEX record file
- build/<projectname>.bin ... plain binary file generated with "objcopy.exe". This file is used to program the controller flash using the firmware upgrade feature of our GUIs. For details on the ams bootloader, refer to the app note *ApplicationNoteAmsPicBootloader_v01.pdf*

2.3 MPLABX projects

2.3.1 MPLABX installation

To build the MPLABX based firmware source code projects, you must install the MPLABX IDE version 1.41 or higher. This tool can be downloaded for free on the Microchip website, and is currently available here:

<http://www.microchip.com/pagehandler/en-us/family/mplabx/>

After installation, you must add the C30 compiler to the available build tools. This is done in the dialog which is opened with

Tools -> Options

Refer to section "Embedded", and check if your compiler is listed under "Build Tools". If it is not listed, please add the C30 compiler tool-chain here.

For further information on the Microchip MPLABX IDE (e.g. how to open, generate, build projects, etc.), please refer to the documentation which comes with the MPLABX IDE installation.

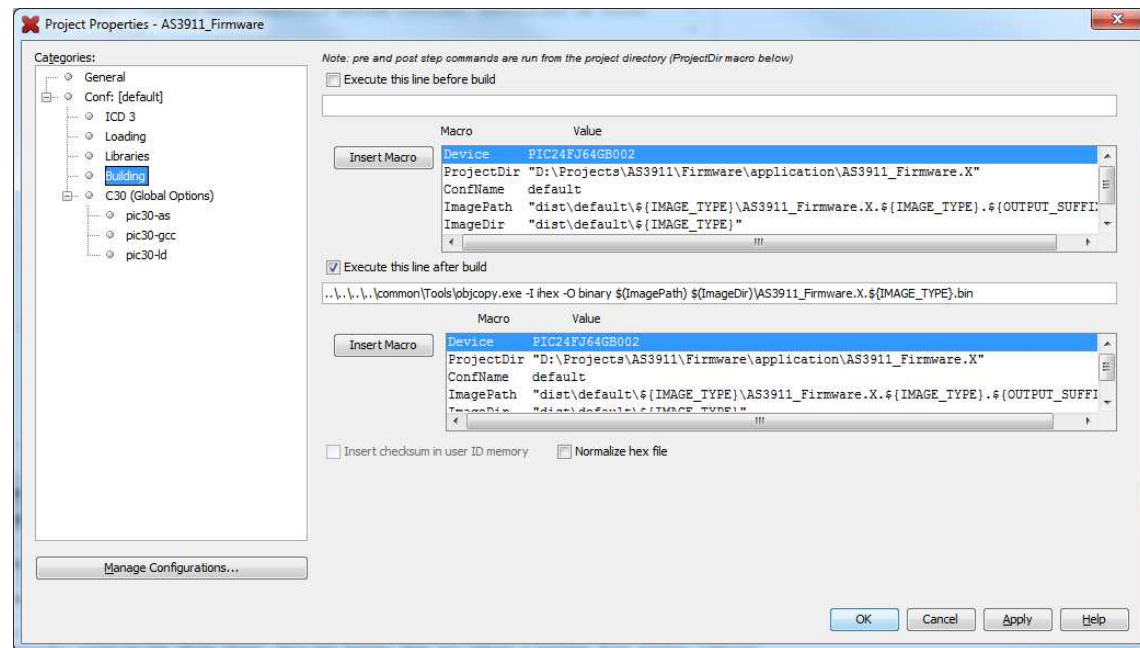
2.3.2 Build firmware projects for bootloader with MPLABX IDE

To generate the plain binary file used with the firmware upgrade feature of our GUIs, a post build command must be invoked.

Command Line to generate plain binary file:

```
..\..\..\common\Tools\objcopy.exe -I ihex -O binary $(ImagePath)
$(ImageDir)\<projectname>.${IMAGE_TYPE}.bin
```

This line should be enabled in the build properties dialog, section "Execute the line after build":



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