PICOCAP®

Data Sheet

PCap Assembler

Assembler Software for PICOCAP Devices

January 16th, 2013
Document-No.: DB_PCap-Assembler_en V0.0

Published by acam-messelectronic gmbh
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Content

1   Assembler

The current version of the assembler is developed on the basis of PCapØ1. It can be used also for other PICOCAP devices.

Features

Platform:	Windows 2000, XP, Vista (32-Bit), Windows-7 (32 and 64)
Type of Assembler:	Single Path Assembler
Source-File:	*.asm, according to the PCapØ1 assembler syntax
Target-File:	Output. hex, downloadable Hex-File
Instruction:	<command> [<parameter1>, <parameter2>] For example: nop or add a, b or jCarC case1
Comment(s):	Single line comment: ; Multi line comment: <COMMENT> … <ENDCOMMENT>
Includes:	<command> [<parameter1>, <parameter2>] For example: nop or add a, b or jCarC case1
Constants:	Constants can be defined with: CONST myConst8 15 The constants have to be declared before they are used for the first time.
Number formatting:	Numbers can be written in decimal or hexadecimal notation e.g.: load a, 16355 or load a, Ox3FE3
Jump labels:	To jump within the code, you can use jump labels together with the various conditional jump op-codes like jcd p1, jEQ p1 etc. E.g.: jCarC label1 label1: move a, b
Addressing:	Addressing is automatically done by the assembler. Please note that the maximum user program size is 4kB (including all header files, library files and calibration banks).
Subroutines:	Subroutines can be executed with the special opcode ‚jsb' and ‚jrt'.

1.1   Installing the Assembler

Insert the CD-ROM. Locate the Assembler folder and run setup.exe to install the program. Restart the computer if required. After the installation you will find in the START menu an item „PCapØ1 Assembler". Run this to start the assembler program.

1.2   Running the Assembler

In the START menu there is an item „PCapØ1 Assembler". Run this to start the assembler program.

1.2.1   Assembler Online Help

The following sections give just a short description of the assembler program. For a detailed description of the assembler software please use the online help of the program. The online help can be opened from the Menu or by pressing the F1 button.

The following help window opens up:
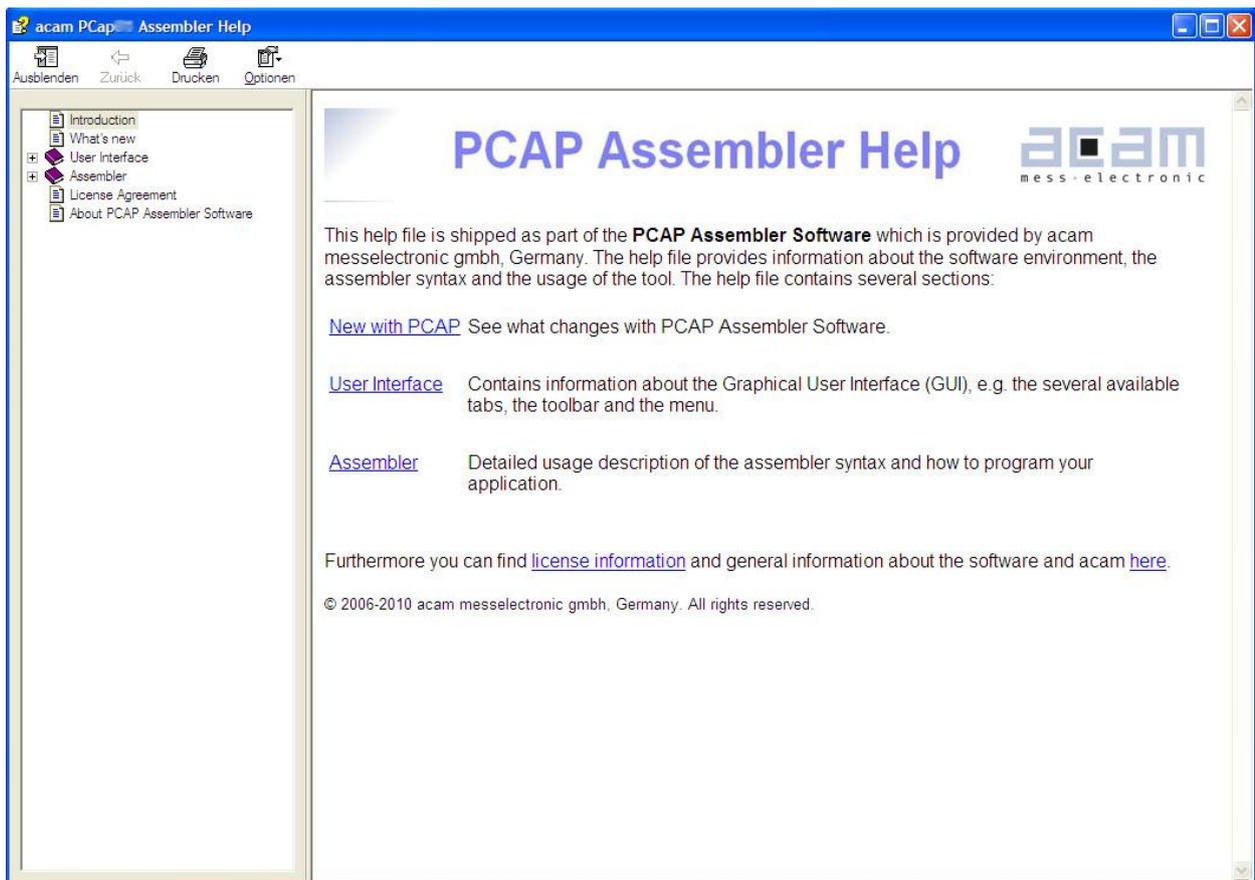
Figure 1-1: Integrated online help of PCapØ1 Assembler

1.2.2   Assembler Page
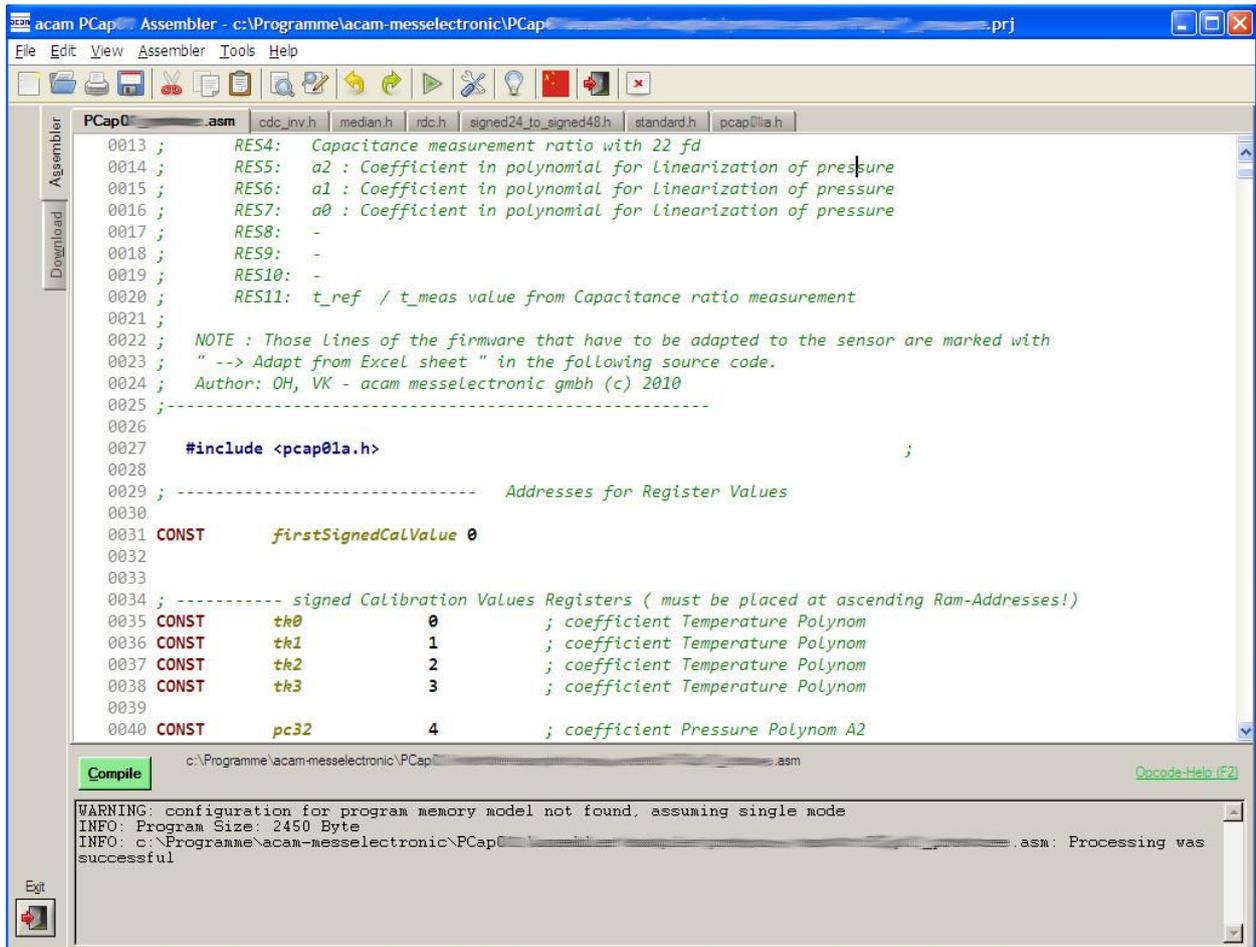
Figure 1-2: Assembler source code window

The 'Assembler' tab is the main window to open all the source code and include files. It consists of a status message window at the bottom and buttons to operate the assembler. By clicking the green link labeled ‚Opcode-Help (F2)' an integrated online help pops up which provides detailed information about the available op codes.

The controls in detail:

Source code window:	This window is used as the source code and include files editor for the assembler listings (*.asm & *.h files). This is a pure editor window; any number of tabs can be opened in this window. This page allows the user to display and edit any file. The files can be manually opened, saved and closed. The location of the file displayed in the window currently is displayed next to the 'Compile' button.
	Additional features are line numbering, syntax highlighting and integrated comment handling. Standard editor tasks like cut, copy &

	paste or find & replace, etc. can be performed. You can modify the settings for the editor via the tool settings dialog. To know more about 'Include' files and how to use them, see section 1.2.2.1 below.
Assembler button:	The assembler button to compile the source code along with the respective header files is: Compile. On pressing the Compile button the source file is compiled to a downloadable hex code. If the compilation was successful a message is displayed accordingly. If the compiling fails, an error message occurs. If more than one source files are currently open, then the *.asm that will be compiled on pressing the Compile Button, has the filename in bold letters on the tab. It is the first opened .asm file in the window that is always compiled.
Save Project button:	When a source code (*.asm) file and all the respective include (*.h) files are open in the Assembler tab, then all the files can be combined and saved in a project file (*.prj), by pressing the Save Project button. The .prj file always takes the name of the *.asm file. For e.g. A source code file sample.asm uses 'include' files include1.h and include2.h. Then the corresponding prj file would be saved by the name sample.prj. Once saved, the project file can be opened from the menu File → Open project → *.prj file. This automatically closes all currently open files and opens all the files (*.asm and *.h) belonging to the project in one go. The *.prj file can also be opened and edited in this Window. Note1: The .asm and .h files can be in different folders or locations. The *.prj file stores the location of the file while saving the project. Note2: When the PCapØ1 Assembler software is closed, a .prj project file is automatically generated with all the files that are currently open in the window. The name of this project file will be that of the open source code file with a .prj extension. This .prj file will be used to open all these files again when the PCapØ1 Assembler software is started again.
Open Project button:	An already saved project (with a *.prj file), can be opened using this button
Status message window:	In this window there are the output messages of the assembler displayed. In case the assembly process was successful, a corresponding message appears with the path of the file that was compiled. If an error occurs while assembling, an error message appears together with the line number and the file name in which the error occurred. An error in any of the source code (*.asm) file or "include" (*.h) files is identified and intimated with the path of the file.
Opcode-Help:	Between the source code window and the status message window

	there can be found a green link labeled ‚Op code-Help (F2)'. By clicking this link another window pops up. The window contains the op code online help. Every supported op code is explained there in detail. The additional windows are based on the integrated Microsoft Windows ® Help system and can be operated separately. (Windows is a trademark of Microsoft Corporation)

Running the assembler in order to compile your source file is the first step when using the PCapØ1 Assembler Software.

An integrated 'examples' folder provides some readymade firmware code for downloading into the PCapØ1 chip. The standard firmware (.asm and .hex) is present in the 'standard' folder under 'examples'.

The user can also add his own examples to the 'Examples' folder with the respective prj file. The prj file can be written manually (See format of existing prj files in the Examples folder) or can be allowed to be generated by the assembler with the Save Project button. The Search-Examples dialog box can be accessed via the Help menu or by pressing F4 or by clicking on the 'Bulb' icon on the top. Only *.prj project files can be opened via the Search Examples option. To open individual files, use the File → Open option.

1.2.2.1   'Include' files

The basic idea of supporting 'include' files is to provide more modularity and flexibility within your code. That means, instead of packing all needed source code to a single assembler listing (*.asm files) you can roll out some pieces of code to the include files (also called header files with extension *.h). The advantage of this method is, that the readability of your code will be improved and that once written parts of code can be reused (e.g. configuration information).

To include parts of code by using a include file there are two steps needed.

Step 1: Create an include file (e.g. config.h).

Step 2: Declare the inclusion in your assembler listing as follows: #include „config.h"

Include files that are in the same folder as the source file (*.asm) can be included with #include "filename.h". Include files that are in a path one level higher than the source file can be included with "../filename.h". If there is a set of common include files, they can be segregated in a folder called Lib in *PCapO1 \Assembler\lib*. The 'include' files in the lib

folder can be included in the program by using #include <filename.h>. They are automatically included from the lib folder.

On installing the assembler software, the *PCapO1 \Assembler\lib* is pre-installed. It contains all the library and header files that are used in the examples. You can add your library or header files to this folder.

The alternative method of using a single assembler files without using 'include' files at all is also supported.

1.2.3   Download Page

The 'Download' tab displays the compiled hex code that can be downloaded into the PCapØ1 chip. The hex-file is displayed in rows with 16 bytes per row. The location of the displayed hex file is shown at the top of the window. Now this hex file can be written into the OTP or the SRAM of the PCapØ1 chip for e.g. using the Evaluation software.

Figure 1-3: Hex-file display

1.2.4   Assembler Settings

Different settings for the assembler and the editor can be done by selecting the item "Settings" in the "Tools" menu. A screen appears that shows the following sheets:
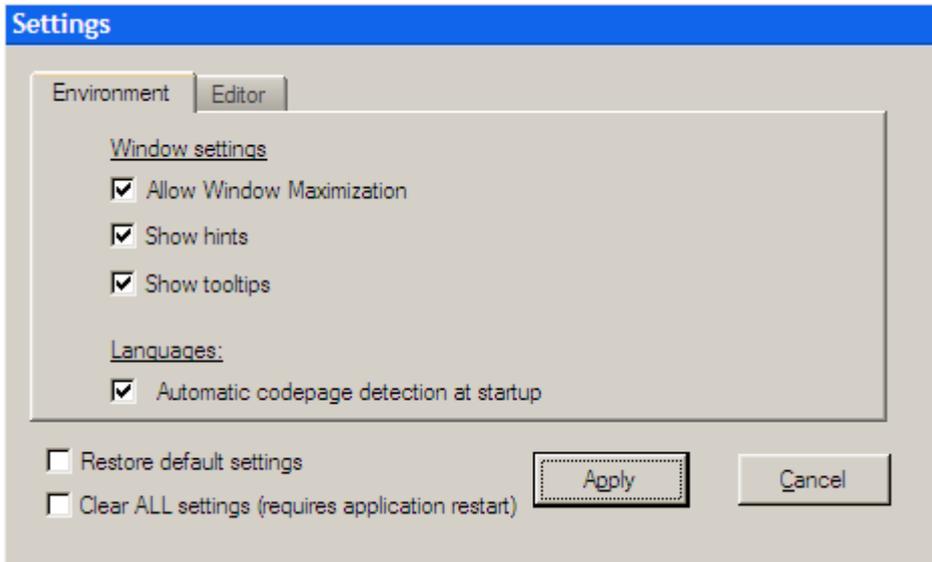
Figure 1-4: Environment settings
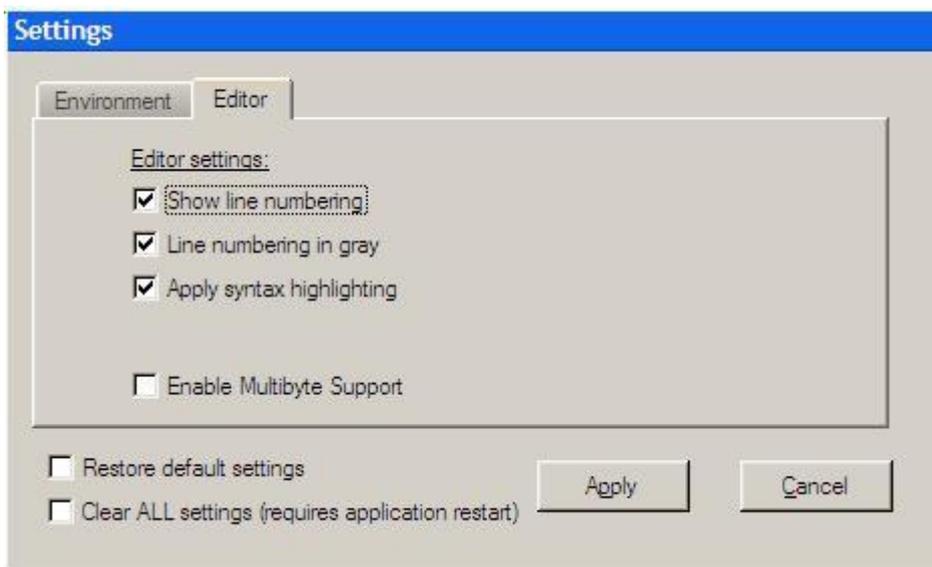
Figure 1-5: Editor settings

2 Miscellaneous

2.1 Literature Guide

Data Sheets

Title	Document-No
PCapO1-DSP Single-chip Solution for Capacitance Measurement Digital Signal Processor	DB_PCapO1_DSP_e.pdf
PCapØ2A Single-chip Solution for Capacitance Measurement Volume 1: General data and front-end description	DB_PCapO2A_Vol1_en.pdf
PCapØ2Ax-DSP Single-chip Solution for Capacitance Measurement Volume 2: Digital Signal Processor	DB_PCapO2A_Vol2_en.pdf
PCapØ1-EVA-Kit Evaluation System for PCapØ1	DB_PCapO1-EVA-Kit_en.pdf
PCapØ2-EVA-Kit Evaluation System for PCapØ2	DB_PCapO2-EVA-Kit_en.pdf
PCapØ2plus Evaluation Software for PICOCAP Devices	DB_PCapO2plus_en.pdf

White Papers

Title	Document-No

Application Notes

Title	Document-No

The latest versions of the available documents can be downloaded from the acam website at:

http://www.acam.de/download-center/picocap

2.2 Document History

16.01.2013   First release