

ADOver Application Maestro™ Module

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1. Introduction

The primary objectives of A/D Oversampling Application Maestro™ module are to enable the user to achieve a higher precision (number of useful bits) from an A/D converter with reduced programmer's effort. With this library programmers can shift from cumbersome calculations and peripheral setup to a high level like approach with commands to initialize the oversampling process and to get data. This allows user to focus on the requirements of their applications. It provides a non-interrupted based operation and has data buffer. Module code is linkable and relocatable, which provides user facility to use it without modifications.

2. Module Features

The ADOver module presents the following features:

- Polling based design.
- Relocatable assembly Code set for both 16xxx and 18xxx families.
- User-defined number of extra bits, channel and Reference Voltage Source.
- Simple functions to initialize and execute an oversampled conversion.

3. List of Component Modules

ADOver.ex.txt	This is main test file developed to demonstrate use of the module.
ADOver.asm	This file contains the variables used by the oversampling process along with the code to select between PIC 16xxx and PIC18xxx implementations.
16ADOver.asm	This is the PIC 16xxx A/D Oversampling code implementation file.
18ADOver.asm	This is the PIC 18xxx A/D Oversampling code implementation file.
ADOver.inc	This file contains definition of shared parameters for use in Assembly language. One needs to include this file in the Assembly file where they are calling library routines. This file is taking care of definition of all Extern Global parameter so one can directly call library routines in their program.
16xxx.inc	This file contains definition of shared parameters for use in Assembly language. One needs to include this file in the Assembly file where they are calling library routines. This file is taking care of definition of all Extern Global parameter so one can directly call library routines in their program.
18xxx.inc	General-purpose processor definition file for 18xxx family. It selects processor dependant '.inc' file for library module according to processor selection in development mode.

4. Using the Library Module in a Project

Please follow below steps to use this library module in your project.

1. Use the Application Maestro™ software to configure your code as required (Number of extra bits).
2. Launch MPLAB® IDE, and open the project's workspace.
3. Verify that the Microchip language tool suite is selected (*Project>Select Language Toolsuite*).
4. In the Workspace view, right-click on the "Source Files" node. Select the "Add Files" option. Select ADOver.asm and click **OK**.
5. Now right-click on the "Linker Scripts" node and select "Add Files". Add the appropriate linker

- file (.1kr) for the project's target microcontroller.
6. Add any other files that the project may require. Save and close the project.
 7. In your main source (.asm) file, add include directive at the head of the code listing to include .ADOver.inc . By doing so, all files required to make the generated code work in your project will be included by reference when you build the project.
 8. To use the module in your application, invoke the functions or macros as needed.

5. List of Shared Parameters

Shared Data Bytes

vADOverLow and vADOverHigh

These are the data bytes containing the result of an Oversampling A/D Conversion.

Shared Functions

ADOverInit

This Function executes all necessary initializations of the Oversampling Firmware

ADOverGetData

This function executes the oversampled A/D conversion

6. Functions

Use this section to provide a more complete description of each function. Duplicate the blank table for each shared function and fill in the required information for each. If a table breaks across a page boundary due to size, carry the entire table over to the next page.

Function	<i>ADOverInit</i>
Preconditions	
Overview	This procedure initializes all necessary internal variables associated with the Oversampling code
Input	
Output	
Side Effects	Data bank may change. Obs: The Initialization process <u>requires</u> the user's code to select the channel (ANx) and the A/D Port Configuration, i.e. the I/O pins selected as Analog Channels and A/D Voltage references. It also requires the user's code to define the I/O pins of the related PORT as Inputs or Outputs accordingly
Stack Requirement	One Level (the function call itself)

Function	<i>ADOverGetData</i>
Preconditions	<i>ADOverInit must have been invoked</i>
Overview	This function executes the oversampled A/D process.
Input	
Output	The result in <i>vADOverLow and vADOverHigh</i>
Side Effects	Data bank may change. During the conversion process the part is put in sleep mode and all interrupts are suspended.
Stack Requirement	One Level (the function call itself)

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