

## ADCPol Library Module (Polled)

1.	<b>Introduction .....</b>	<b>2</b>
2.	<b>Module Features .....</b>	<b>2</b>
3.	<b>List of Component Modules.....</b>	<b>3</b>
4.	<b>Using the Library Module in a Project .....</b>	<b>3</b>
5.	<b>List of Shared Parameters .....</b>	<b>4</b>
	<i>Shared Data Bytes .....</i>	<i>4</i>
	<i>Shared Functions .....</i>	<i>4</i>
	<i>Shared Macros .....</i>	<i>4</i>
6.	<b>Functions .....</b>	<b>5</b>
7.	<b>Macros.....</b>	<b>6</b>
8.	<b>Port and ADC Reference Voltage Configuration Tables.....</b>	<b>8</b>

## **1. Introduction**

ADCPol is a general-purpose library module for processors PIC18C242, PIC18C252, PIC18C442, PIC18C452, PIC18F242, PIC18F252, PIC18F442, PIC18F452, PIC18F6620, PIC18F6720, PIC18F8620 & PIC18F8720. It configures ADC module for polling mode and provides a descriptive interface in the form of macros and functions.

## **2. Module Features**

- Checks whether ADC is busy or idle.
- User selectable acquisition time to allow for settling of analog signal, before start of AD conversion.

### 3. List of Component Modules

ADCPol.P18.ex.txt	This file demonstrates the usage of the ADCPol library module.
ADCPol.asm	This file contains the functions of the ADCPol library module. <u>User needs to include this file in their project.</u>
ADCPol.inc	This file contains the macros of the ADCPol library module. <u>User needs to include this in their '.asm' file</u> , where the library module macros & functions are utilized.
P18xxx.inc	General purpose processor definition file for PIC18xxx family

### 4. Using the Library Module in a Project

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

1. Use Application Maestro to configure the module as required.
2. At the 'Generate Files' step, save the output to the directory where your project code resides.
3. Launch MPLAB, and open the project's workspace.
4. Verify that the Microchip language tool suite is selected (*Project>Select Language Toolsuite*).
5. In the Workspace view, right-click on the "Source Files" node. Select the "Add Files" option. Select ADCPol.asm and click **OK**.
6. Now right-click on the "Linker Scripts" node and select "Add Files". Add the appropriate linker file (.lkr) for the project's target microcontroller.
7. Add any other files that the project may require. Save and close the project.
8. Include 'ADCPol.inc' in your '.asm' file, where ADCPol library functions & macros are utilized.

## 5. List of Shared Parameters

### **Shared Data Bytes**

VADCPolChannelNumber\_A    The content of this gives the ADC channel that is being sensed

### **Shared Functions**

ADCPolAcquisitionTime    This provides acquisition time delay before start of AD conversion. The required acquisition time is entered by the user in Application Maestro.

### **Shared Macros**

mADCPolInit    Configures the ADC as per user options. This sets channel 0 as default ADC channel. If user wants to use a different channel, he can select the required channel by invoking macro mADCPolChannelSelect.

mADCPolChannelSelect    Selects the ADC channel. This macro calls a function. The purpose of having this macro is to pass parameter for channel number. This macro gives the warning message "WARNING: The processor does not have the selected ADC channel", if the user selects a channel not available for the processor. The channel selection is ignored in the above case and the previous channel will be used for next conversion.

mADCPolStart    Starts the AD conversion.

mADCPolIsBusy    Checks whether the AD conversion is over or not.

mADCPolReadHigh    This reads the high byte of the ADC result into WREG.

mADCPolReadLow    This reads the low byte of the ADC result into WREG

mADCPolDisable    Switches off the ADC.

## 6. Functions

Function	ADCPolAcquisitionTime
Preconditions	None
Overview	Provides acquisition time delay before start of AD conversion. The required acquisition time is entered by the user in Application Maestro.
Input	None
Output	None
Side Effects	WREG changes
Stack Requirement	1 level deep

## 7. Macros

Macro Overview	<p><code>mADCPolInit</code></p> <p>Configures the ADC as per user options. This sets channel 0 as default ADC channel. If user wants to use a different channel , he can select the required channel by invoking macro <code>mADCPolChannelSelect</code>.</p>
Input	<p>This macro takes one or two arguments depending upon the processor used. For processors PIC18C242, PIC18C252, PIC18C442, PIC18C452, PIC18F242, PIC18F252, PIC18F442, &amp; PIC18F452 ADC port configuration name is the only argument required. Chose the appropriate port configuration name from Table 1. For processors PIC18F6620, PIC18F6720, PIC18F8620 &amp; PIC18F8720 this macro requires two arguments. The first argument is the port configuration name &amp; the second argument is the ADC reference voltage configuration name. Chose these arguments from Table 2 &amp; 3 respectively.</p> <p>Example1: Single Argument  ; AN0-AN4 analog ports, VREF+ is V<sub>DD</sub>, VREF- is V<sub>SS</sub>  <code>mADCPolInit ADCPORTCONFIG2</code></p> <p>Example 2: Two arguments  ; AN0-12 analog ports, External VREF+ at AN3, VREF- is AV<sub>SS</sub>  <code>mADCPolInit ADCPORTCONFIG2,ADCREferenceCONFIG1</code></p>
Output	None
Side Effects	WREG changes
Stack Requirement	None
Macro Overview	<p><code>mADCPolChannelSelect</code></p> <p>Selects the ADC channel. This macro calls a function. The purpose of having this macro is to pass parameter for channel number. This macro gives the warning message "WARNING: The processor does not have the selected ADC channel", if user selects a channel not available for the processor. The channel selection is ignored in the above case and the previous channel will be used for next conversion.</p> <p>Example: To select the ADC channel 11, write  <code>mADCPolChannelSelect D'11'</code> or <code>mADCPolChannelSelect .11</code></p>
Input	ADC channel number as the macro argument.
Output	Stores the selected channel number in the location <code>AdcPolChannelNumber</code>
Side Effects	WREG changes
Stack Requirement	1 level deep
Macro Overview	<p><code>mADCPolStart</code></p> <p>Starts the AD conversion.</p>
Input	None
Output	None
Side Effects	None
Stack Requirement	None
ADC Library Module (Polled)	

Macro	mADCPolIsBusy
Overview	Checks whether the AD conversion is over or not.
Input	None
Output	WREG contains 0x0 if the AD conversion is over, else 0x1.
Side Effects	None
Stack Requirement	None

Macro	mADCPolReadHigh
Overview	This reads the high byte of the ADC result into WREG.
Input	None
Output	WREG
Side Effects	None
Stack Requirement	None

Macro	mADCPolReadLow
Overview	This reads the low byte of the ADC result into WREG
Input	None
Output	WREG
Side Effects	None
Stack Requirement	None

Macro	mADCPolDisable
Overview	Switches off the ADC.
Input	None
Output	None
Side Effects	None
Stack Requirement	None

## 8. Port and ADC Reference Voltage Configuration Tables

**Table 1: Port Configuration**

(For processors PIC18C242, PIC18C252, PIC18C442, PIC18C452 PIC18F242, PIC18F252, PIC18F442, PIC18F452)

A-Analog port D-Digital port

PORT CONFIGURATION NAME	PORT AN7	PORT AN6	PORT AN5	PORT AN4	PORT AN3	PORT AN2	PORT AN1	PORT AN0	ADC VREF+	ADC VREF-
ADCPORCONFIG0	A	A	A	A	A	A	A	A	VDD	Vss
ADCPORCONFIG1	A	A	A	A	VREF+	A	A	A	AN3	Vss
ADCPORCONFIG2	D	D	D	A	A	A	A	A	VDD	Vss
ADCPORCONFIG3	D	D	D	A	VREF+	A	A	A	AN3	Vss
ADCPORCONFIG4	D	D	D	D	A	D	A	A	VDD	Vss
ADCPORCONFIG5	D	D	D	D	VREF+	D	A	A	AN3	Vss
ADCPORCONFIG6	A	A	A	A	VREF+	VREF-	A	A	AN3	AN2
ADCPORCONFIG7	D	D	A	A	A	A	A	A	VDD	Vss
ADCPORCONFIG8	D	D	A	A	VREF+	A	A	A	AN3	Vss
ADCPORCONFIG9	D	D	A	A	VREF+	VREF-	A	A	AN3	AN2
ADCPORCONFIG10	D	D	D	A	VREF+	VREF-	A	A	AN3	AN2
ADCPORCONFIG11	D	D	D	D	VREF+	VREF-	A	A	AN3	AN2
ADCPORCONFIG12	D	D	D	D	D	D	D	A	VDD	Vss
ADCPORCONFIG13	D	D	D	D	VREF+	VREF-	D	A	AN3	AN2



**Table 2: Port Configuration**

(For processors PIC 18F6620, PIC18F6720, PIC18F8620 &amp; PIC18F8720)

A-Analog port D-Digital port

PORT CONFIGURATION NAME	A5	A4	A3	A2	A1	A0	N9	N8	N7	N6	N5	N4	N3	N2	N1	N0
ADCPORTCONFIG0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG1	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG2	D	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG3	D	D	D	D	A	A	A	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG4	D	D	D	D	D	A	A	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG5	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG6	D	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A
ADCPORTCONFIG7	D	D	D	D	D	D	D	D	A	A	A	A	A	A	A	A
ADCPORTCONFIG8	D	D	D	D	D	D	D	D	D	A	A	A	A	A	A	A
ADCPORTCONFIG9	D	D	D	D	D	D	D	D	D	D	A	A	A	A	A	A
ADCPORTCONFIG10	D	D	D	D	D	D	D	D	D	D	D	A	A	A	A	A
ADCPORTCONFIG11	D	D	D	D	D	D	D	D	D	D	D	D	A	A	A	A
ADCPORTCONFIG12	D	D	D	D	D	D	D	D	D	D	D	D	D	A	A	A
ADCPORTCONFIG13	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A	A
ADCPORTCONFIG14	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A

**Table 3: ADC Reference Voltage Configuration**

Configuration name	ADC VREF+	ADC VREF-
ADCREERENCECONFIG0	AV <sub>DD</sub>	AV <sub>SS</sub>
ADCREERENCECONFIG1	External VREF+ at AN3	AV <sub>SS</sub>
ADCREERENCECONFIG2	AV <sub>DD</sub>	EXTERNAL VREF- at AN2
ADCREERENCECONFIG3	EXTERNAL VREF+ at AN3	EXTERNAL VREF- at AN2