



**MICROCHIP**

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**AR Configuration Utility (ARCU)  
User's Guide**

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# AR Configuration Utility (ARCU) User's Guide

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**Object of Declaration: AR1010, AR1011, AR1020, AR1021, DV102011, DV102012,  
AR1100, AR1100BRD**

## EU Declaration of Conformity

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USA

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Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA



Derek Carlson  
VP Development Tools

05-DEC-2011

Date

# AR Configuration Utility (ARCU) User's Guide

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NOTES:



# AR CONFIGURATION UTILITY (ARCU) USER'S GUIDE

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## Table of Contents

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<b>Declaration of Conformity .....</b>	<b>3</b>
<b>Preface .....</b>	<b>7</b>
Introduction.....	7
Document Layout.....	7
Conventions Used in this Guide .....	8
Recommended Reading .....	9
The Microchip Web Site.....	9
Customer Support.....	9
Document Revision History .....	9
<b>Chapter 1: Installation.....</b>	<b>11</b>
<b>Chapter 2: Getting Started.....</b>	<b>13</b>
<b>Chapter 3: AR Configuration Utility Layout .....</b>	<b>15</b>

# AR Configuration Utility (ARCU) User's Guide

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NOTES:

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## Preface

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### NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site ([www.microchip.com](http://www.microchip.com)) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXA”, where “XXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE on-line help. Select the Help menu, and then Topics to open a list of available online help files.

## INTRODUCTION

This chapter contains general information that will be useful to know before using the AR Configuration Utility (ARCU). Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- Recommended Reading
- The Microchip Web Site
- Customer Support
- Document Revision History

## DOCUMENT LAYOUT

This document describes the installation and use of the AR Configuration Utility (ARCU). The Microchip ARCU is a Windows®-based graphical user interface that can be used to configure, calibrate, test and demonstrate both the AR1000 and AR1100 touch screen controllers. Additionally, the AR1100 firmware can be updated (re-flashed) via the ARCU. The manual layout is as follows:

- **Chapter 1. Installation**
- **Chapter 2. Getting Started**
- **Chapter 3. AR Configuration Utility Layout**

# AR Configuration Utility (ARCU) User's Guide

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## CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

### DOCUMENTATION CONVENTIONS

Description	Represents	Examples
<b>Arial font:</b>		
Italic characters	Referenced books	<i>MPLAB<sup>®</sup> IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File&gt;Save</i></u>
Bold characters	A dialog button	Click <b>OK</b>
	A tab	Click the <b>Power</b> tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
<b>Courier New font:</b>		
Plain Courier New	Sample source code	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets [ ]	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: {   }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code supplied by user	void main (void) { ... }

## RECOMMENDED READING

This user's guide describes how to use the AR Configuration Utility (ARCU). Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

### **Readme for AR Configuration Utility (ARCU)**

For the latest information on using the AR Configuration Utility (ARCU), read the "Readme.txt" file (an ASCII text file) in the main installation directory. The Readme file contains updated information and known issues that may not be included in this user's guide.

### **Readme Files**

For the latest information on using other tools, read the tool-specific Readme files in the Readmes subdirectory of the MPLAB<sup>®</sup> IDE installation directory. The Readme files contain updated information and known issues that may not be included in this user's guide.

## THE MICROCHIP WEB SITE

Microchip provides online support via our web site at [www.microchip.com](http://www.microchip.com). This web site is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the web site contains the following information:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

## CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at: <http://support.microchip.com>

# AR Configuration Utility (ARCU) User's Guide

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## DOCUMENT REVISION HISTORY

### **Revision A (August 2011)**

- Initial Release of this Document.

### **Revision B (July 2012)**

- Added Declaration of Conformity; Added functional support for the AR1011 and AR1021 controllers; Changed the title from "AR1100 Configuration Utility" into "AR Configuration Utility"; Updated Figures 2-1, 3-1, 3-2, 3-4, 3-6, 3-7, 3-9, 3-13, 3-14 and 3-15; Updated section 3.1; Other minor corrections.



# AR CONFIGURATION UTILITY (ARCU) USER'S GUIDE

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## Chapter 1. Installation

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The Microchip AR Configuration Utility (ARCU) is a Windows-based graphical user interface that can be used to configure, calibrate, test and demonstrate both the AR1000 and AR1100 series touch screen controllers. Additionally, the AR1100 firmware can be updated (re-flashed) via ARCU.

**Note:** This version of the utility (revision 2.20) is the correct one for the AR1011 and AR1021 part numbers. Previous revisions of the utility will not work with these two new devices.

The AR1000 can use either the I<sup>2</sup>C™, SPI or USART based communication protocols, while the AR1100 can use USB or RS-232 (serial). To facilitate AR1000 communications, Microchip's USB-based PICkit™ Serial Analyzer is employed to translate communications from the host PC to the desired embedded protocol, and visa versa. Provided the correct hardware is used, changing protocols in the ARCU is achieved via a wizard or a simple options selection.

### 1.1 INSTALLATION

If installing from a CD, insert the CD into your PC and follow the installation instructions. If installing from a zip file, double click on the file, unzip it and follow the installation instructions.

**Note:** Recommended operating systems include Windows® XP 32- and 64-bit, Windows 7 32- and 64-bit. It will require .NET 2.0 to run this application. Some installations of .NET 4.0 do not include the .NET 2.0 framework. In that case, you will need to download either the 2.0 or 3.5 (Service Pack 1) version of .NET.

# AR Configuration Utility (ARCU) User's Guide

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## Chapter 2. Getting Started

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### 2.1 GETTING STARTED

- If using either the AR1000 or AR1100 Development kits, follow the Connections step in the corresponding Quick Start Guide.
- If using the AR1000, connect the PICKit Serial Analyzer to the PC, the AR1000 board to the PICKit Serial Analyzer, and a sensor to the AR1000 board.  
**Note:** Do not use a USB hub.
- If using the AR1100, connect either the USB or serial communications cable to the AR1100 board and to the PC. Attach a sensor to the AR1100 board. If using a serial connection, apply a 5V power supply to the serial leads (see the AR1100 PCB User's Guide for details).

Start the ARCU by double clicking the desktop icon. After the splash screen disappears, a welcome screen will appear:

**FIGURE 2-1: WELCOME SCREEN**



If this is the first time the ARCU has been used, select the Start Wizard icon to step you through the configuration process. Follow the steps outlined in the Wizard. If using the AR1020 (I<sup>2</sup>C, SPI) Development kit or the AR1100 Development kit (USB, Serial), have the calibration template printed and ready to use.

# AR Configuration Utility (ARCU) User's Guide

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**Note:** If you are using the AR1000 or the AR1020 Development kit, the Configuration Wizard may initially ask you to update the PICkit Serial Analyzer firmware. If it does, cancel out of the Wizard and press the **Update PKSA Firmware** button on the Commands panel. Allow the firmware to update, and then restart the Wizard.

After the Wizard is complete, you should have established communications with the AR1000/AR1100 and you will be taken to the first tab of the ARCU – the **Configuration** tab. The Transactions window (automatically displayed) will show recent communications between the ARCU and the controller.

If there were errors, they will appear in red text in the Transaction window. Communication errors are generally the result of physical connection or jumper issues. If you have errors, check your connections and restart the wizard by pressing the **Wizard** button on the Commands panel (Basic view) or in the Ribbon Tools Group (Diagnostic view).

After you have successfully completed the Wizard, touch the sensor and observe the touch reports scrolling in the Transactions window.

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## **Chapter 3. AR Configuration Utility Layout**

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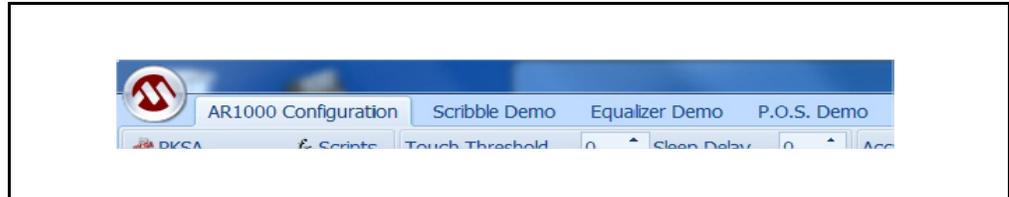
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### **AR CONFIGURATION UTILITY LAYOUT**

The ARCU has four tabs, or pages:

- The Configuration Tab
- The Scribble Demo
- The Equalizer Demo
- The P.O.S. Demo

**FIGURE 3-1: TABS**



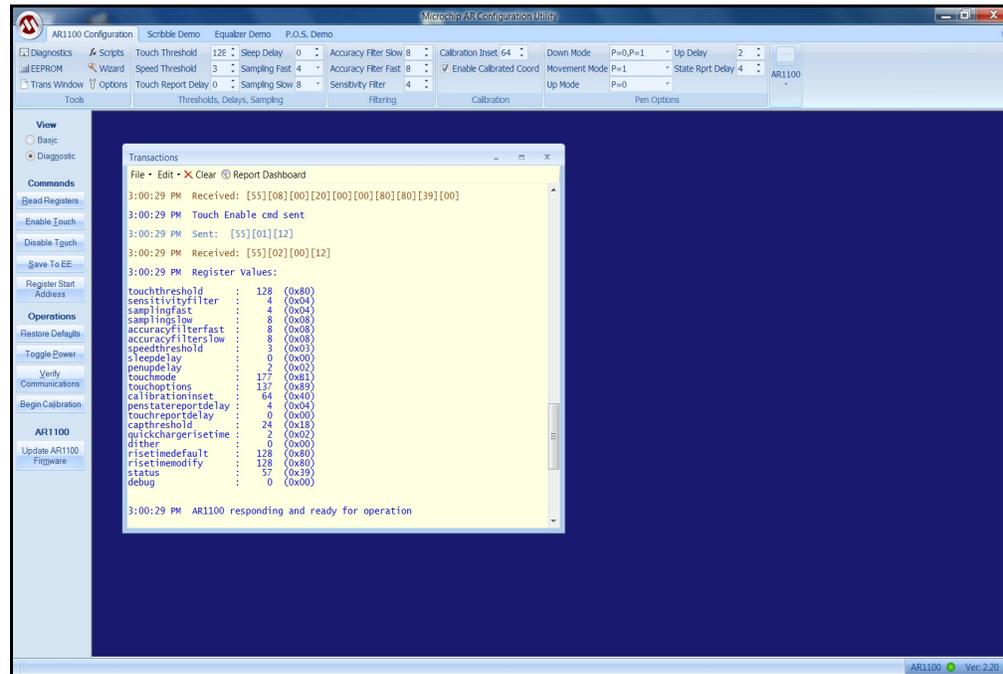
**Note:** The text of the **Configuration** tab and the title bar will vary between AR1000 and AR1100, depending on how the ARCU is configured.

The **Configuration** tab is used to test, calibrate and configure the AR1000/AR1100. The remaining tabs display typical AR controller demonstrations. If using the demonstration tabs with a sensor in front of the PC screen, make sure the ARCU is maximized to ensure proper cursor alignment.

# AR Configuration Utility (ARCU) User's Guide

## 3.1 THE CONFIGURATION TAB

FIGURE 3-2: CONFIGURATION TAB IN DIAGNOSTIC VIEW



# AR Configuration Utility Layout

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The AR Configuration page contains all the controls necessary to configure, calibrate and test the AR1000 and the AR1100. The Configuration page consists of the following areas:

- Ribbon Tools Group
- Ribbon Registers Group
- Commands Panel
- Status Bar

**Ribbon Tools Group** These are several helper windows used for various operations. Press a button to open its window. Each window's purpose is described in **Section 3.1.3 "Ribbon Tools Group"**.

**Ribbon Registers Group** The AR1000/AR1100 Configuration registers are logically grouped here. You may change a register's value directly through its control. Changes are immediately written to the controller's registers and recorded in the Transactions window. Hover your mouse over a register control to see its tool tip description. See the AR1000 or AR1100 data for more detail about each register.

**Commands Panel** Various firmware and utility commands and operations are located here. Results of a command/operation will be displayed in the Transaction window. Hover your mouse over a button to see its tool tip description.

**Status Bar** The status bar, located at the bottom of the GUI, gives current information regarding the state of the Configuration Utility. The LED in the right corner gives the status of the AR1000 or AR1100 connection. The ARCU version number is also displayed in the right corner. The touch report rate (reports per second) is displayed in the left corner.

**Note:** The ribbon tools and register groups are not available in the Basic view (see **Section 3.1.1 "View"**).

# AR Configuration Utility (ARCU) User's Guide

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## 3.1.1 View

There are two views available for the **Configuration** tab: Basic and Diagnostic. The Basic view is a subset of the Diagnostic view, hiding the parameter controls in the ribbon and displaying a simplified set of buttons on the command panel. This view is sufficient for initial exploration of the AR1000/AR1100 controllers, allowing the user to see cursor coordinates, report rates, error messages, etc. Most commands and operations are available as well (calibration, enabling/disabling the controller, reading registers, etc.).

The Diagnostic view displays the AR1000/AR1100 configuration parameters in the ribbon and allows the user to change their values, fine tuning the controller's response for a particular sensor or application.

The view can be changed via the radio buttons on the commands panel (see Figure 3-3).

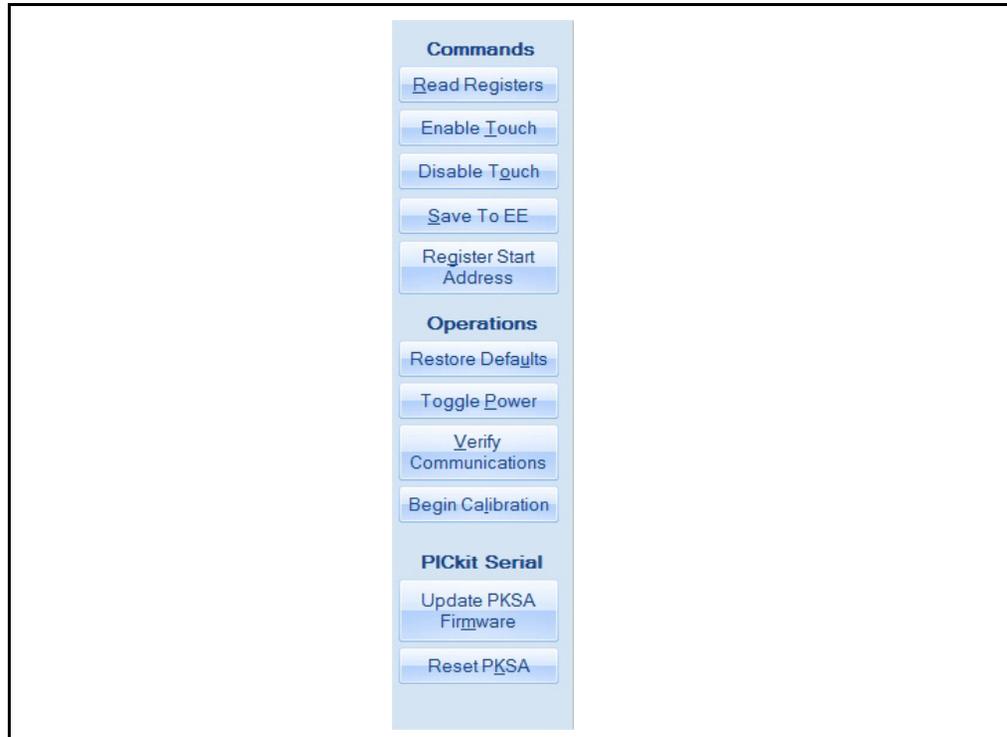
**FIGURE 3-3: VIEW CONTROL**



## 3.1.2 Commands Panel

The Commands panel holds various command and operations buttons and is located on either the right or left side of the main screen, depending on the layout preference.

**FIGURE 3-4: COMMANDS PANEL**



<b>Read Registers</b>	Reads the AR1000/AR1100 Configuration registers, displays the values on the Transactions window, and then updates the register controls in the ribbon.
<b>Register Start Address</b>	Sends a command to read the register start address value. See the data sheet for more information.
<b>Enable Touch</b>	Sends a command to enable touch for the AR1000/AR1100. If AR1000 is in I <sup>2</sup> C or SPI mode, initiates a macro in the PICkit Serial Analyzer to read touch reports when AUX2 for I <sup>2</sup> C or Aux1 for SPI, goes high.
<b>Disable Touch</b>	Sends a command to disable touch for the AR1000/AR1100. If AR1000 is in I <sup>2</sup> C or SPI mode, disables the macro in the PICkit Serial Analyzer used to read touch reports.
<b>Save to EE</b>	Writes the current register values to the EEPROM and updates the displayed values in the EEPROM window (if the EEPROM window is open, see Figure 3.1.3.2).

# AR Configuration Utility (ARCU) User's Guide

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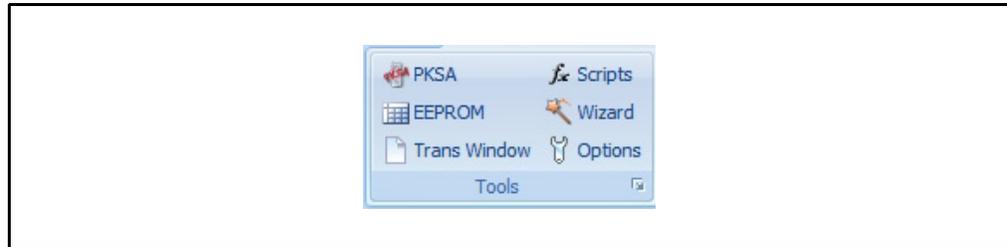
<b>Restore Defaults</b>	Restores default register values to the AR1000 by clearing the lower half of the EEPROM and power-cycling the board. Cycling power forces the AR1000 to read register and calibration values from the EEPROM. However, if EEPROM values are cleared, the AR1000 will use default register values. For the AR1100, the upper portion of the EEPROM is cleared and a Reset command is issued to force default values to be used.
<b>Toggle Power</b>	Reads VDD being supplied by the PICKit Serial Analyzer, turns the voltage off for 250 ms, and then restores VDD and pauses for another 250 ms. The effect of this is to power cycle the AR1000. This will force it to read register values from EEPROM. It has no effect on the AR1100.
<b>Verify Communications</b>	Tests communication by sending a command to read the PICKit Serial Analyzer firmware version and a command to enable touch to the AR1000. For the AR1100, this command will also read the registers.
<b>Begin Calibration</b>	Sends calibration command to the AR1000/AR1100. A calibration panel will appear over the entire computer screen with cross hairs appearing, showing where to touch. See the data sheet for a detailed explanation of the calibration process.
<b>Update PKSA Firmware</b>	(AR1000 only) Opens a file selection dialog box allowing the user to select a PICKit Serial firmware hex file. Download begins immediately after, and requires no user input. The GUI will display messages on the Transaction window right after start-up, if the firmware needs to be updated.
<b>Update AR1100 Firmware</b>	(AR1100 only) Opens a file selection dialog box allowing the user to select an AR1100 firmware hex file. Download begins immediately after and requires no user input. User must select first of a set of three hex files of the form xyzBoot.hex.
<b>Reset PKSA</b>	(AR1000 Only) Issues a Reset to the PICKit Serial Analyzer. This disables any macros running in the PICKit Serial Analyzer. This usually is only necessary if a command needs to be issued in the Scripts dialog.

# AR Configuration Utility Layout

## 3.1.3 Ribbon Tools Group

The Ribbon Tools Group contains seven windows launch buttons, of which only five or six are visible at a time, depending on the protocol being used by the ARCU.

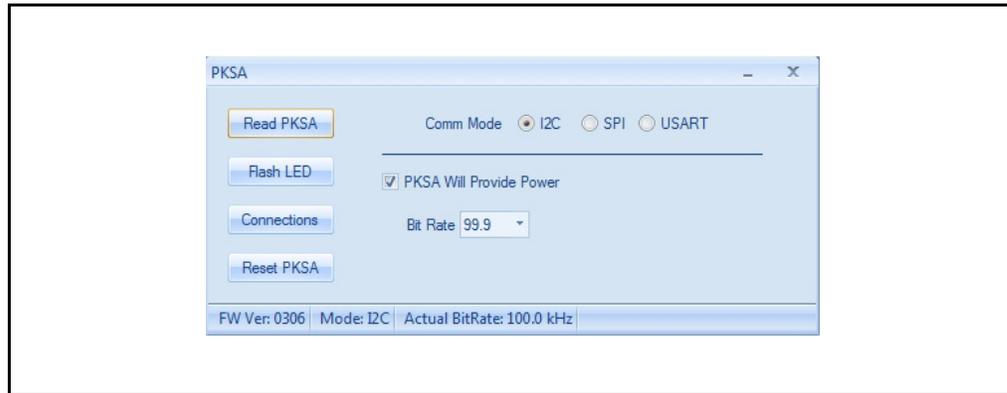
**FIGURE 3-5: TOOLS GROUP**



### 3.1.3.1 PICKit SERIAL ANALYZER WINDOW (AR1000 ONLY)

The PKSA window is used to modify the settings of the PICKit Serial Analyzer, including which communications mode (protocol) to use.

**FIGURE 3-6: PICKit SERIAL ANALYZER WINDOW**



#### Comm Mode

Selects the method of communications your device will be using. Selecting one of the radio buttons automatically configures the PICKit Serial Analyzer, if attached, for that mode. The Communications mode is retained from run to run, and can only be changed here, in the Options menu, or in the Wizard.

#### I<sup>2</sup>C™

This is the default mode. When selected, you may change the bit rate by selecting a new value from the drop-down menu.

#### SPI

You can change the bit rate by entering in a value (in MHz) into the text box and pressing Update. The PICKit Serial Analyzer will configure its bit rate as close as possible to that value and display the actual value in the status bar below.

#### USART

There are no configuration options available for USART. The baud rate is fixed at 9600 to match the AR1000.

#### PKSA Will Provide Power

Check if you wish to have the PICKit Serial Analyzer provide a constant 5V V<sub>DD</sub>. Uncheck if you will be providing external power to the AR1000.

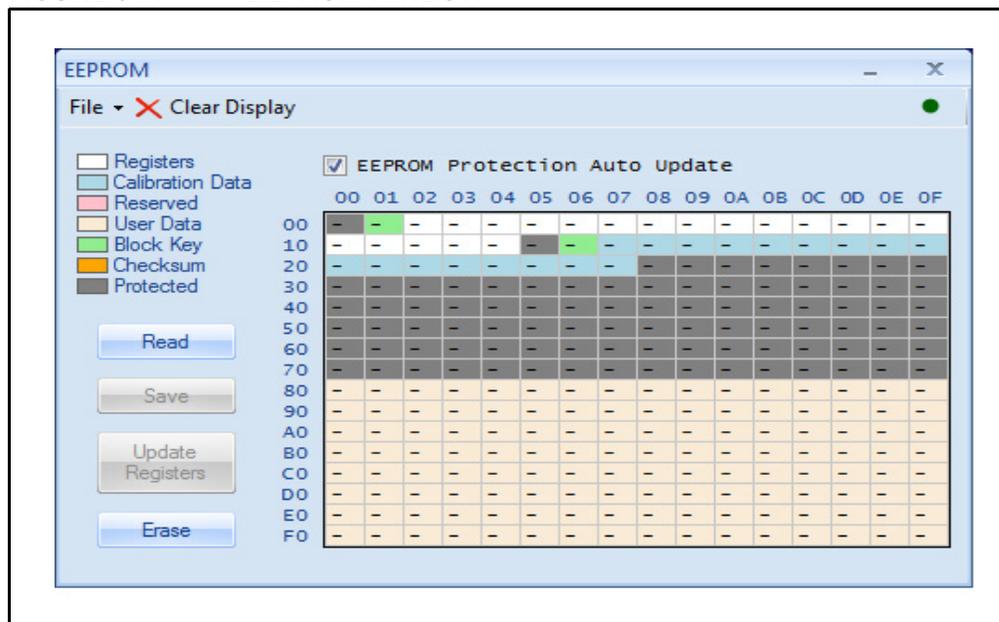
# AR Configuration Utility (ARCU) User's Guide

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<b>Read PKSA Button</b>	Reads the configuration of the PICKit Serial Analyzer and then proceeds to update the control and status bar.
<b>Flash LED Button</b>	Causes the PICKit Serial Analyzer to flash one of its LEDs (usually the 'Busy' LED) for two seconds. You can use this to verify communications with the PICKit Serial Analyzer.
<b>Connections</b>	Brings up a small window displaying the pin out of the PICKit Serial Analyzer for a given communication's mode.
<b>Reset PKSA Button</b>	Issues a Reset to the PICKit Serial Analyzer. This disables any macros running in the PICKit Serial Analyzer that would interfere with script execution. This button has the same function as the <b>Reset PKSA</b> button on the Command panel in the main window.
<b>Status Bar</b>	Displays the current configuration parameters.

## 3.1.3.2 EEPROM WINDOW

**FIGURE 3-7: EEPROM WINDOW**



The EEPROM window is used to display and modify the contents of the AR1000 and AR1100 EEPROM. There are 256 bytes in the EEPROM, one-half of which are reserved for use by the AR1000; the other half is available for user data. Bytes 0x00-0x7F are used by the AR1000 for register and calibration data. Bytes 0x80-0xFF are free to be used by the host without risk of affecting AR1000 operation.

For the AR1011 and AR1021, an EEPROM protection checkbox has been added to prevent unexpected results when making changes to the reserved registers section.

For the AR1100, bytes 0x00-0x5F are available for user data; the rest is reserved for register and calibration data.

EEPROM 'profiles', representing the values in the window, can be saved and opened via the File menu, and then written to the EEPROM via the **Save** button.

### File Menu

- Open Profile** Opens existing profiles as .txt or .csv files.
- Save Profile** Saves displayed profiles as .txt or .csv files.
- Close** Closes the window.

**Clear Button** Clears the contents of the window; does not erase the EEPROM.

**Status LED** Glows bright when the displayed values match the contents of the EEPROM; dimmed when the displayed values do not. **Note:** The EEPROM is not actively monitored by the utility; the LED is updated in response to user activity.

**Read Button** Reads and displays the contents of the EEPROM.

**Save Button** Writes the displayed values to the EEPROM.

# AR Configuration Utility (ARCU) User's Guide

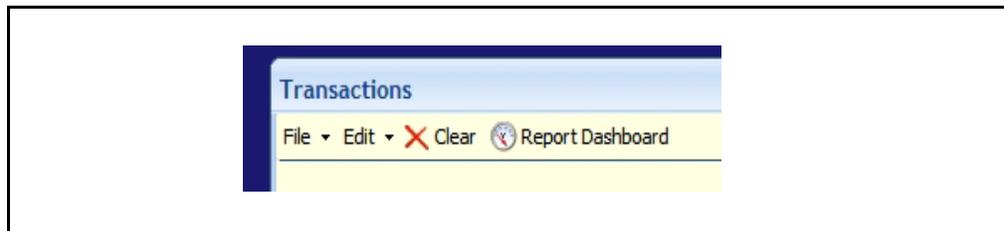
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<b>Update Registers Button</b>	Writes the displayed values to the AR1000/AR1100 registers.
<b>Erase Button</b>	Erases the contents of the EEPROM.
<b>Legend Keywords</b>	
<b>Registers</b>	Bytes of data that set the controller's options.
<b>Calibration Data</b>	Bytes of data that contain information from calibration.
<b>Reserved</b>	These bytes are not recommended for direct modification unless directed to by support.
<b>User Data</b>	A section of the EEPROM that is available to end users.
<b>Block Key</b>	A unique byte indicating the presence of valid data in the next data block.
<b>Checksum</b>	An 8-bit value that is calculated by starting with the hexadecimal value 0x45, then adding all data values in the previous data block (including the block key byte) and finally using only the lower-byte portion of the calculated sum.
<b>Protected</b>	Non-selectable EEPROM area to protect from invalid byte data corruption.

### 3.1.3.3 TRANSACTIONS WINDOW

The Transactions window displays data sent to and received from the AR1000/AR1100, status and error messages, and touch report information. Sent data, received data and error messages are color-coded. The Transactions window can also display `.txt` and `.rtf` files. Multiple windows can be open at a time. However, only the most recently opened window will display real time information.

**FIGURE 3-8: TRANSACTIONS WINDOW**



#### File Menu

- Open** Opens existing `.txt` or `.csv` files. Automatically clears the window before opening the file.
- Save** Saves contents of window as `.txt` or `.rtf` files.
- Close** Closes the window.

#### Edit Menu

- Copy** Copies selected text to the clipboard.
- Paste** Pastes clipboard data to the window.
- Select All** Selects all of the data in the window.

# AR Configuration Utility Layout

**Clear All** Clears all of the contents of the window.

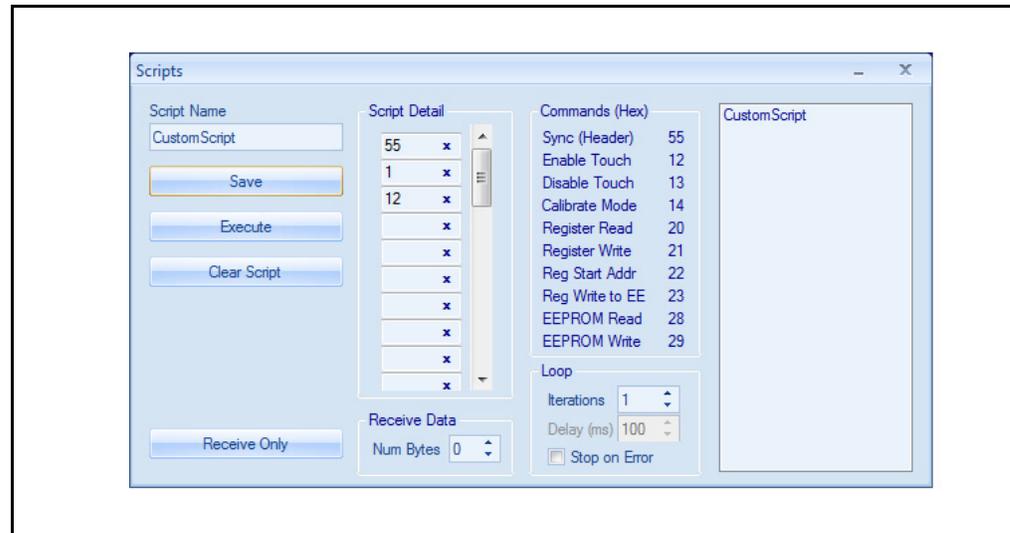
**Clear Button** Clears all of the contents of the window.

**Report Dashboard** Toggles the visibility of the Touch Report Dashboard. The dashboard graphically displays the touch report rate, error rate, and pen mode.

Text and images can also be typed or pasted into the Transaction window and saved along with existing content.

## 3.1.3.4 SCRIPTS WINDOW

**FIGURE 3-9: SCRIPTS WINDOW**



The Scripts window is used to create, save, and execute low-level commands. Script execution is protocol agnostic. That is; a given script will work with an AR1000 that is in I<sup>2</sup>C, SPI or USART mode or an AR1100 in HID-Generic mode (will not work in HID-Digitizer or HID-Mouse mode). To load an existing script, double click the script name in the far right panel.

A script consists of two parts; data sent to the AR1000/AR1100 (bytes contained in the Script Detail box), and data received in response (expected byte count displayed in the Receive Data box). Data sent by and received in response to the script are displayed in the Transactions window.

To create a script, enter a name you wish to give it, fill in the bytes in the Script Detail, and then enter the expected return byte count in the Receive Data. Save or execute the script by pressing the appropriate button. For more information about the format of the commands, see the AR1000 or AR1100 data sheet.

**Script Name** When creating a script, enter a name here.

**Save Button** Saves the script.

**Execute Button** Executes the displayed script. Results are shown in the Transactions window. **Note:** For the AR1000, it may be necessary to press the **Reset PKSA** button to disable any running macros before a script can be run.

**Clear Script Button** Clears the current script.

# AR Configuration Utility (ARCU) User's Guide

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<b>Reset PKSA Button</b>	(AR1000 only) Issues a Reset to the PICkit Serial Analyzer. This disables any macros running in the PICkit Serial Analyzer that would interfere with script execution. This button has the same function as the <b>Reset PKSA</b> button on the Command panel in the main window.
<b>Receive Only Button</b>	Issues a read command without sending a script. This aids in low-level testing of the AR1000/AR1100 by allowing you to separate the sending of a script (with 0 expected bytes) and at a later time, issue a Read command.
<b>Script Detail</b>	Enter the body of the script here. By default, bytes are interpreted as hexadecimal. If you wish to use decimal, click on the 'x' in a byte text box to change the radix. Data displayed in the Transactions window is always hexadecimal, however.
<b>Receive Data</b>	Enter the number of expected return bytes.
<b>Commands</b>	Command values; see the AR1000 and AR1100 data sheets for information about a specific command.
<b>Loop</b>	Scripts may be run for a specified number of iterations, or to run continuously, enter an iteration value of 0. The delay between each iteration may be adjusted by the Delay control. Check the <b>Stop on Error</b> checkbox to stop script iteration in the event of an error.
<b>Script Panel</b>	The far right panel contains the names of existing scripts. Double click the script name to load it.

## 3.1.3.5 WIZARD

**FIGURE 3-10: CONFIGURATION WIZARD**



The Wizard steps you through the process of configuring and calibrating the AR1000 and the AR1100. If you are using the touch sensor provided in one of the development kits, print out the calibration template before beginning the Wizard. You will use this template to provide a standard set of calibration points so the movement of your finger or stylus on the touch sensor is correctly reflected on your computer monitor.

Depending on your choices in the Wizard, you may be asked to install an optimized Configuration register profile. This profile will be written to the EEPROM and reflected in the Configuration registers after completion of the Wizard.

The Wizard is one of the choices you have the first time you run the Configuration Utility. However, you may run the Wizard again at any time by pressing the **Wizard** button, located in the Tools group in the ribbon in the Diagnostic view, or on the Commands Panel when in Basic view.

# AR Configuration Utility (ARCU) User's Guide

## 3.1.3.6 OPTIONS WINDOW

The Options window contains several parameters that allow you to configure the GUI for your particular work environment. Some options are strictly for cosmetic purposes, while others allow you to fine tune the GUI according to your computer's capabilities. All options are retained from run to run.

**FIGURE 3-11: OPTIONS WINDOW**



**Restore Defaults**

Changes all options to their default values.

**Enter Demo Mode**

Hides the **Configuration** tab and launches the Scribble demo. Use this mode to ensure that users do not have access to the Configuration registers.

**Ribbon Layout**

Allows you to expand or collapse groupboxes within the ribbon. Depending on the size of your monitor, you may want to collapse groupboxes you do not use often. If a groupbox is collapsed, you can still access its controls by clicking on it. Its controls will appear below the ribbon.

**Startup Monitor**

Allows you to choose in which monitor the application will start. This option has no effect if there is no secondary monitor present.

**Show Welcome Screen**

Check this if you want the welcome screen to open the next time you start the GUI.

# AR Configuration Utility Layout

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<b>Touch Report Buffer Size</b>	<p>A typical touch sensor transmits 100 to 200 touch reports per second. Computers with slower processors may have a difficult time keeping up with the higher rates, so touch reports are buffered by the GUI and sent in mass to the Transaction window to reduce CPU usage. Increasing this value sends updates to the Transaction window less frequently and decreases CPU usage. Decreasing this value updates the Transaction window more often, but increases CPU usage. While the effect of faster updates is a more fluid response in the Transaction window, the potential danger is dropped bytes in the touch reports due to CPU starvation. A good rule of thumb is to keep your CPU performance under 50% while touch reports are being generated, as indicated by the Windows Task Manager.</p>
<b>Mouse Mode</b>	<p>This option allows you to change how the GUI interprets pen up, down, and move touch reports for the AR1000.</p> <p>The default method examines the contents of each report to make this determination based on the default values used in the TouchMode register. <b>Important:</b> If the default values are not used in the TouchMode register, this method will not work.</p> <p>Use the Timer-based method if default values are not used in the TouchMode register. This mode simply sends mouse move events, if touch reports are being generated and sends a mouse up event 100 milliseconds after the last touch report.</p>
<b>Show Cursor – Config</b>	<p>Allows the cursor to be controlled by touch reports on the Configuration page. Checking this option will make it easier to navigate between the <b>Configuration</b> and other tabs, but may make it confusing while using touch reporting on the Configuration page. For example, while pressing on the Transactions window, the window may behave strangely because it is trying to update touch reports in real time, but also trying to insert the cursor wherever the touch is being generated.</p> <p>It is recommended this option be left unchecked until you become familiar with the operation of the AR Configuration Utility.</p>
<b>4, 9, 25 Point Calibration</b>	<p>Choose how many points to use during the calibration procedure. More points will provide more accurate tracking, especially for larger sensors. This option only applies to the AR1100.</p>
<b>Num Wires</b>	<p>Select the number of wires your sensor has. The option for 5-wire is not shown since it is hardware selectable on both the AR1000 and AR1100 and will override 4 or 8-wire selection.</p>
<b>Communication Mode</b>	<p>Select which communication protocol you wish to use. Press the <b>Test Communication</b> button to initialize the protocol in the GUI and attempt communication with the AR1000/AR1100.</p>

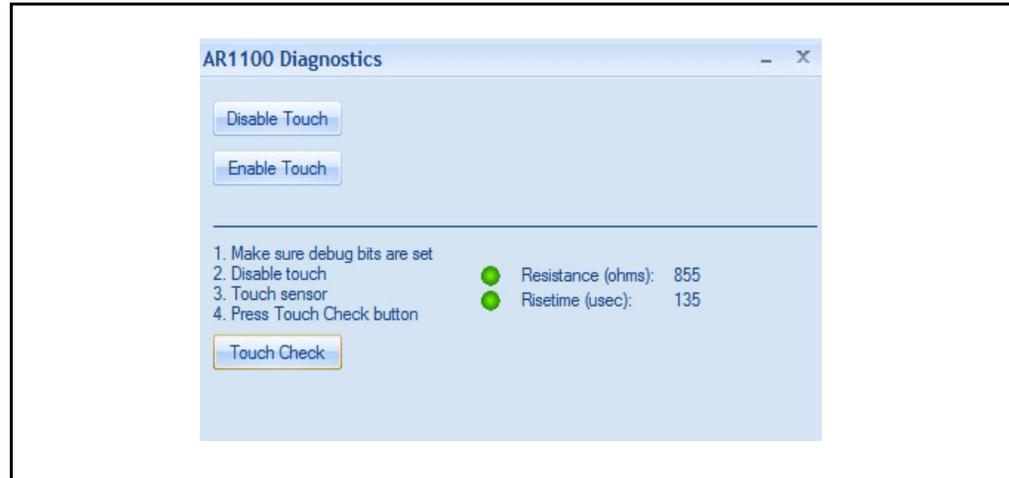
# AR Configuration Utility (ARCU) User's Guide

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<b>Help Dock</b>	Allows you to dock the Help panel to the left or right of the GUI, or float it as a separate window.
<b>Commands Dock</b>	Allows you to dock the Commands panel to the left or right of the GUI.
<b>Test This Port First</b>	Tells the GUI to try using the port in the accompanying drop down first when attempting to find the AR1100. The default method is to loop through all available COM ports until the AR1100 is found, but this has the possibility of changing port settings for another device that is attached.
<b>COM Port</b>	Lists all available COM ports found on the PC. Select the one to which the AR1100 is attached and check the box to the left to have the GUI test communications on that port before others.

## 3.1.3.7 DIAGNOSTICS WINDOW (AR1100 ONLY)

**FIGURE 3-12: DIAGNOSTICS WINDOW**



The Diagnostics window is used to run resistance and risetime diagnostics. In order for a diagnostic to be generated, the following bits must be set in the AR1100 groupbox in the ribbon:

**Resistance:** Risetime Resistance (RTR)

**Risetime:** Risetime (RT)

To generate a diagnostic, perform the following steps:

- Set the above bits.
- Disable touch.
- Touch and hold the sensor.
- Press the **Touch Check** button.
- Enable touch when finished.

The measured resistance and risetime will be displayed in the Diagnostics window and the Transactions window will display the commands and responses.

**Disable Touch Button** Disables touch response on the AR1100. Touch must be disabled prior to running a diagnostic.

**Enable Touch Button** Enables touch response on the AR1100. You should enable touch after running a diagnostic.

**Touch Check Button** Sends a `TOUCH_CHECK` command to the AR1100.

**Diagnostic Results** A LED will glow bright green if the diagnostic was successfully measured and the value will be displayed along side.

# AR Configuration Utility (ARCU) User's Guide

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## 3.1.4 Keyboard Shortcuts

The AR Configuration Utility has a multitude of keyboard shortcuts that can be used to quickly navigate through the utility. The included keyboard shortcuts are:

**Help** Press the F1 key to bring up the Help menu

**Command Bar Shortcuts** To use the command bar keyboard shortcuts, first press the ALT key, followed immediately by the underlined character on the command bar. The letter is capitalized here for visibility.

**View:**

<b>Basic View</b>	ALT + I (I as in Icarus)
<b>Diagnostic View</b>	ALT + N

**Commands:**

<b>Read Registers</b>	ALT + R
<b>Enable Touch</b>	ALT + T
<b>Disable Touch</b>	ALT + O
<b>Save To EE</b>	ALT + S
<b>Register Start Address</b>	ALT + G

**Operations:**

<b>Restore Defaults</b>	ALT + U
<b>Toggle Power</b>	ALT + P
<b>Verify Communications</b>	ALT + V
<b>Begin Calibration</b>	ALT + L
<b>Start Wizard</b>	ALT + W

**AR1000/AR1100:**

<b>Update PKSA Firmware</b>	ALT + M
<b>Reset PKSA</b>	ALT + K

**Ribbon Shortcuts** To use the ribbon keyboard shortcuts, first press and release the ALT button on the keyboard followed by pressing two keys according to the list below.

**Tools Ribbon:**

<b>Diagnostics Window</b>	ALT, A, D
<b>EEPROM Window</b>	ALT, A, E
<b>Trans Window</b>	ALT, A, T
<b>Scripts Window</b>	ALT, A, S
<b>Wizard</b>	ALT, A, W
<b>Options</b>	ALT, A, O

# AR Configuration Utility Layout

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## Thresholds, Delays, Samplings:

<b>Touch Threshold</b>	ALT, B, T
<b>Speed Threshold</b>	ALT, B, S
<b>Touch Report Delay</b>	ALT, B, D
<b>Sleep Delay</b>	ALT, B, P
<b>Sampling Fast</b>	ALT, B, F
<b>Sampling Slow</b>	ALT, B, W

## Filtering:

<b>Accuracy Filter Slow</b>	ALT, C, W
<b>Accuracy Filter Fast</b>	ALT, C, F
<b>Sensitivity Filter</b>	ALT, C, S

## Calibration:

<b>Calibration Inset</b>	ALT, D, I (I as in Icarus)
<b>Enable Calibrated Coord</b>	ALT, D, E

## Pen Options:

<b>Down Mode</b>	ALT, E, D
<b>Movement Mode</b>	ALT, E, M
<b>Up Mode</b>	ALT, E, U
<b>Up Delay</b>	ALT, E, P
<b>State Rprt Delay</b>	ALT, E, R

## AR1100:

<b>EEV</b>	ALT, F, E
<b>CALV</b>	ALT, F, L
<b>DRT</b>	ALT, F, D
<b>RiseTm Default</b>	ALT, F, T
<b>RiseTm Modify</b>	ALT, F, M
<b>Dither</b>	ALT, F, I
<b>TEN</b>	ALT, F, N
<b>Verbose Cal</b>	ALT, F, V
<b>DRT</b>	ALT, F, W
<b>RT</b>	ALT, F, R
<b>RTC</b>	ALT, F, C
<b>RTR</b>	ALT, F, A
<b>SP</b>	ALT, F, S
<b>MM</b>	ALT, F, B

# AR Configuration Utility (ARCU) User's Guide

## 3.2 THE DEMONSTRATION TABS

The AR Configuration Utility has three tabs that can be used to test and demonstrate touch movements: **Scribble**, **Equalizer**, and **Point-Of-Sale** (P.O.S.).

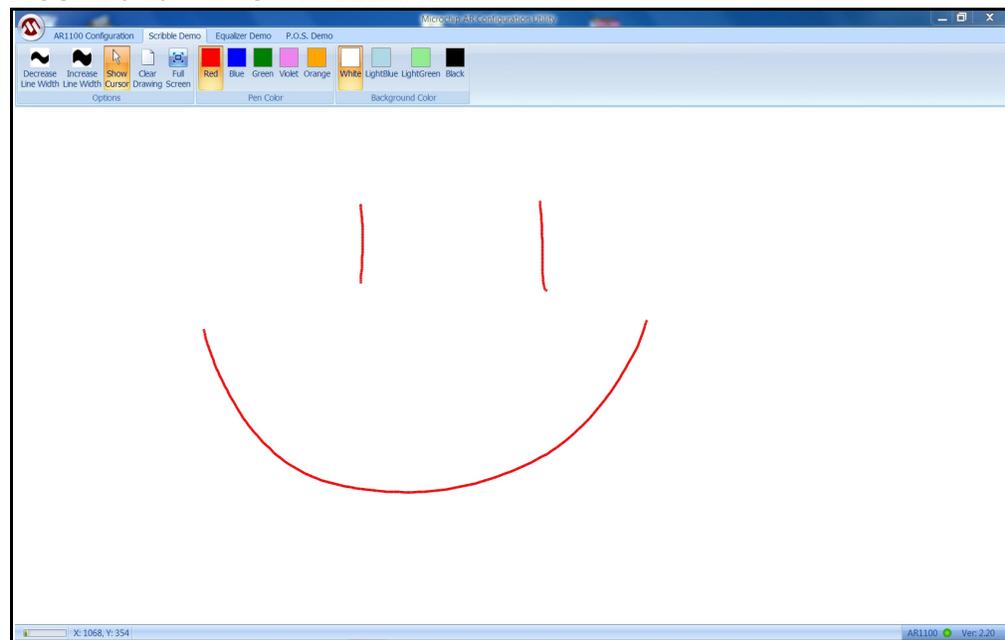
Ideally, you would have a touch sensor the same size as your computer monitor, or laptop screen. Then you could place it over your monitor, attach it to the AR1000/AR1100, perform a calibration and use your finger or stylus to interact with the controls on the demonstration tabs.

The AR1000 and AR1100 development kits provide an alternative method. You can use the included touch sensor along with the templates provided in the Calibration Template document to interact with the P.O.S. demonstration tab controls. Print out the Calibration Template document (be sure to print it at 100% of its size) and run the Wizard located in the Tools group of the ribbon. If you have already run the Wizard and have established communications with the AR1000/AR1100, you can also simply press the **Begin Calibration** button on the Commands panel and use the template instead of the on-screen calibration points.

**Note:** When interacting with the demonstration tabs via the templates, the AR1000/AR1100 will also control your cursor; however, your mouse is still usable.

### 3.2.1 Scribble Tab

FIGURE 3-13: SCRIBBLE TAB

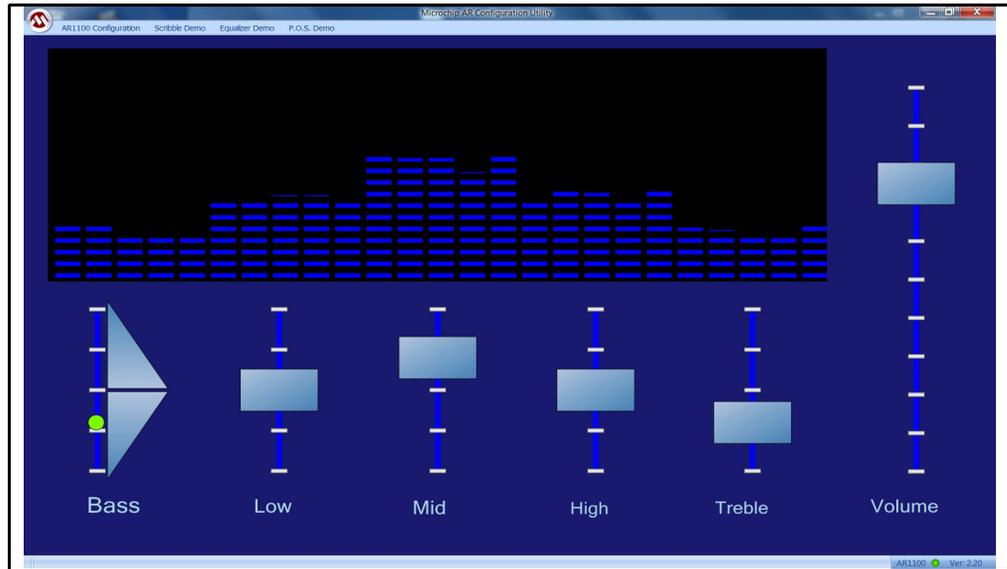


Scribble is a simple drawing program. The first set of buttons allows you to increase or decrease the width of the pen, clear the drawing, and enter Full Screen mode. The second set of buttons allows you to change the color of the pen. The third set of buttons allows you change the background color. You also have the option of using this tab in Full Screen mode.

# AR Configuration Utility Layout

## 3.2.2 Equalizer Tab

FIGURE 3-14: EQUALIZER TAB

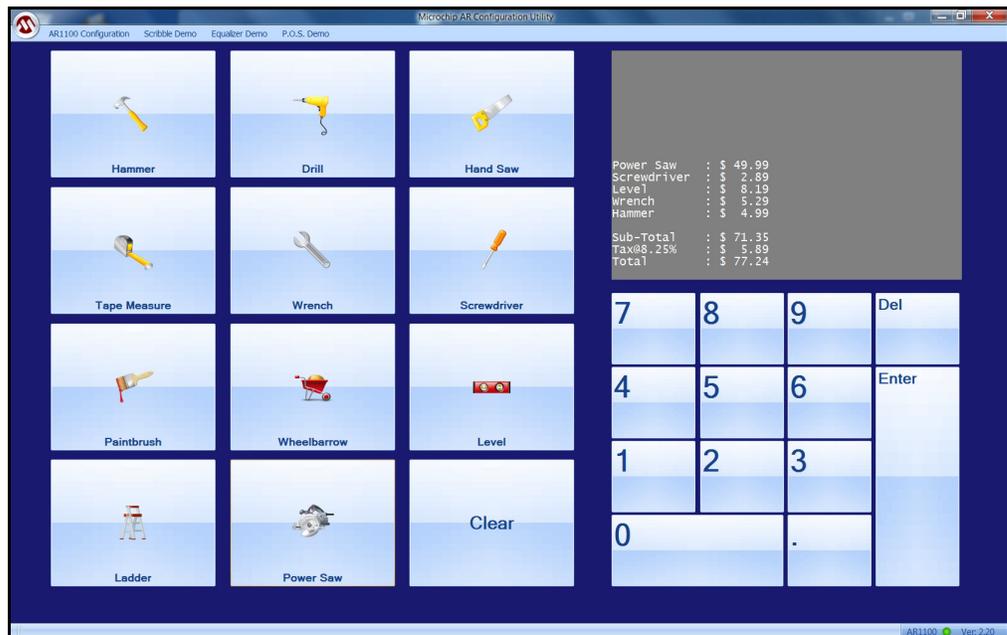


This tab demonstrates a graphic equalizer. All of the controls are sliders, except the Bass control. To change the Bass control setting, press and hold the **Up** or **Down** button next to the scale.

The Bass control is different than the rest to demonstrate an alternative technique that achieves the same result. Press the **Up/Down** buttons to change the equalizer value.

## 3.2.3 P.O.S. Tab

FIGURE 3-15: P.O.S TAB



This is a point-of-sale emulator. Press an item button to add that item to your shopping list. The **Clear** button resets your shopping list. There is also a numeric keypad for entering unspecified items.

# AR Configuration Utility (ARCU) User's Guide

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