

# USING THE ASERSM1A SERIAL EEPROM IN-CIRCUIT INTERFACE ADAPTER

The ASERSM1A is specifically designed to support in-circuit programming of serial eeproms and compatible PIC microcontrollers. The adapter supports both low voltage (LV) and 5 volt (+5) parts using a two switch combination to select the desired voltage. The ASERSM1A adapter connects to the in-circuit component (serial eeprom) using standard cable assemblies provided by Andromeda Research. There are cable assemblies with clips for DIP (through hole) and SOIC (surface mount) devices plus probe sets with individual probes. Two probe sets are available that allow connection to both SOIC, MSOP and TSOP packages where each probe attaches to a single device pin. The AccuTouch Probe, used with SOIC8 parts, provides a "quick connection" option with eight 4 point crown, spring loaded pins. Each cable assembly terminates with a 10 pin female connector (plug) on the end opposite the clip, probe or probe set. The cable assembly is EIA color coded for easy connection to the serial eeprom pins. (PIN#1-BROWN, PIN#2-RED, PIN#3-ORANGE, PIN#4-YELLOW, PIN#5-GREEN, PIN#6-BLUE, PIN#7-VIOLET, PIN#8-GREY).

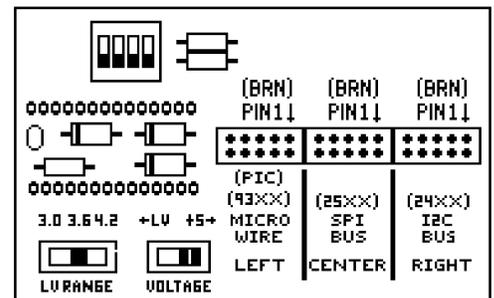


## INSTALLING THE ADAPTER

To install the adapter into the programming unit, lift the handle on the programming unit ZIF socket to about 45 degrees. This will release the mechanism and allow the adapter base pins to be inserted into the socket. **NOTE:** This adapter has a 28 pin base and must be fully left justified in the 32 pin programming unit socket. After the adapter is inserted and flush with the socket, release the handle to lock the adapter in place. To remove the adapter, reverse the procedure.

## CONNECTING THE CABLE ASSEMBLY TO THE ASERSM1A ADAPTER

The ASERSM1A adapter includes three 10 pin header groups. Each group of pins supports a specific family of serial eeprom device. The pin groups are defined as LEFT, CENTER and RIGHT. The left group supports the MicroWire family of serial eeproms (93XX), the center group supports the SPI BUS family (25XX/95XX) and the right group supports I2C BUS (24XX) devices. Each group is clearly marked with bold white vertical lines plus the device family name and typical industry number (93XX, 25XX, 24XX). To attach the female connector and cable to the proper header group align the connector such that the **brown wire (Pin #1) is on the right**. This is marked directly above each header group. Position the female connector such that the holes in the connector align with the pins in the selected group and press the connector onto the pins. Be sure the connector is flush against the base of the header.



**NOTE:** When a device part number is selected, the system software will indicate where the cable connector (black plug) should be attached. The placement will be described as **PLUG OR DEVICE POSITION LEFT, CENTER or RIGHT**. These descriptions (see figure) refer to the adapter header groups (left, center, right).

## SETTING THE OPERATING VOLTAGE - THE KEY TO IN-CIRCUIT PROGRAMMING

The goal in using the ASERSM1A adapter with the EPROM+ programming system is to read and program the serial eeprom without removing (unsoldering) the part from the assembly. The ASERSM1A adapter uses two slide switches to select the operating voltage which is applied to the device and thus to the assembly to which the chip is attached. The actual voltage applied to the part will determine not only how the part reacts but also how the attached circuitry responds. There are two issues which typically cause problems with in-circuit reading and programming. The first and most common is operation of the microcontroller which controls the module or assembly. If the microcontroller becomes active, it will attempt to access the serial eeprom at the same time as the programmer. Note that when the programmer applies power to the serial eeprom, the applied voltage back feeds into the entire assembly which causes all circuitry to become active. The circuitry which is physically connected to the serial eeprom pins will conflict with the signals applied by the programmer. The programming unit incorporates push-pull drive circuitry to force valid signal levels without damaging other attached components. The second issue which can cause a problem is that the active assembly circuitry will load a signal line required to read or program the serial eeprom. Both of these issues are addressed using the voltage selection switches on the ASERSM1A adapter.

**VOLTAGE SELECTION SWITCHES** - There are two slide switches on the adapter; VOLTAGE and LV RANGE. The VOLTAGE switch has two positions, +5 (right setting) and LV (left setting). With the VOLTAGE switch set to +5V the applied voltage will be 5 volts. This is usually the factory rated voltage for the assembly and the setting which is most likely to cause reading and programming problems. With the VOLTAGE switch set to LV the applied voltage is now set by the position of the LV RANGE switch. The LV RANGE switch allows you to choose from three voltages, 3.0 (left), 3.6 (center) and 4.2 (right). Although the voltage change may seem small, remember that the goal is to eliminate microcontroller interference and circuitry loading while still allowing reliable reading and programming of the serial eeprom memory. As the voltage is reduced the capability of the attached circuitry to cause interference is also reduced. Different assemblies/modules will react differently to reduced voltage operation.

## HOW TO CONFIRM SUCCESSFUL AND VALID SERIAL EEPROM DATA ACCESS (V6.0E and up)

Once you have connected the ASERSM1A adapter to the serial eeprom (chip), start by setting the VOLTAGE SWITCH (LV-5V) to LV. Initially set the LV RANGE switch based on the part with which you are working. For 93XX or 24XX parts set the switch to 3.6. If the part is a 95XXX set the switch to 4.2. If the part is a 25XXX set the switch to 3.6. These settings are based on the best opportunity for successful in-circuit access. If valid data cannot be obtained, then change the switch settings to a lower value. If no data can be read try a higher value. To confirm that valid data can be accessed select COMMAND 5 (Press 5). This invokes the buffer editor. Now use the GET VALID DATA command (G). Press G. The system will first determine if the eeprom is responding with data. You are notified if the chip does not respond. If data is available, the system then reads the eeprom contents into the buffer. It then switches to compare mode which compares the data in the buffer with the data in the part. If the data in the buffer and the data in the part match, the buffer data is considered valid. You are notified with PART AND BUFFER MATCH | \*\*\* DATA INDICATES VALID \*\*\* (in green). If the data in the buffer and the data in the part do not match, you will see (in red) PART AND BUFFER DO NOT MATCH | DATA WILL BE DISCARDED. When you press a key the invalid data is cleared from the buffer. The goal is to get a valid read of data into the buffer. You may try different voltages however the higher the voltage the more likely invalid data will result. Once a good read is obtained, proceed with your work. Keep in mind that this procedure is not exact and you are experimenting to obtain the desired result. There are many variables in the manufacture of electronic components and assemblies. You may find that even two identical assemblies will react differently.

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PART AND BUFFER MATCH
*** DATA INDICATES VALID ***
- PRESS ANY KEY TO CONTINUE -
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**OVERCOMING PROGRAMMING PROBLEMS** - It is possible that you can get a good read from a chip but the chip will not program correctly with updated data. This may occur because the on-chip high voltage generator cannot generate the voltage required to program the memory array at the reduced voltage. This is common with the 95XXX family of serial eeproms. If this happens increase the operating voltage and try programming again. If the system indicates DEVICE DID NOT PROGRAM CORRECTLY set the operating voltage back to the value used to obtain the good read and the perform a manual compare using COMMAND 8. If the compare indicates zero errors then the chip is indeed programmed correctly with the new data.

**STATUS REGISTER (95XXX/25XXX parts)** - The SPI technology family parts include an on-chip STATUS register which, if certain bits are set, can block programming of the part. To clear the bits in the status register return to the COMMAND LIST and press Z then R then R. If any bits under the (76543210) are 1 press C. Use the arrow keys and press 0 to change any 1 to a 0. Press Esc then press W to write the new register image to the part. Once this is done, try programming again.

## ADAPTER DIP SWITCH

The ASERSM1A adapter incorporates a 4 position dip switch. Be sure this switch is set according to the diagram when the eeprom part is initially selected. You may recall the switch setting at any time by pressing S from the main command list.

## ADDITIONAL DEVICE FAMILIES

The ASERSM1A supports all serial eeprom devices except FPGA configurators. If you choose a part which is listed in the system software (device selection table) but does not conform to one of the device number families printed on the ASERSM1A adapter, simply observe the specified family name and position reference. Proceed by installing the plug at the specified location (left, center or right). (EXAMPLE: A 95080 is an SPI part and will require the black plug to placed in the center position.)

## DEVICE PIN CONNECTIONS AND THE CABLE COLOR CODE

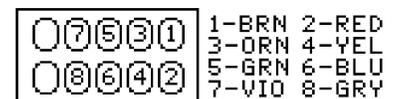
The ASERSM1A adapter maps the header pins to the corresponding color of the connecting cable. The EIA color code is an industry standard whereby each number from 0 through 9 is represented by a corresponding color. The numbers and corresponding colors follow: 0 - BLACK, 1 - BROWN, 2 - RED, 3 - ORANGE, 4 - YELLOW, 5 - GREEN, 6 - BLUE, 7 - VIOLET, 8 - GREY, 9 - WHITE. Notice that the connecting cable is composed of the colors brown through grey (1 through 8). These map directly to the pin numbers of the connected device.

## CONNECTING A PIC MICROCONTROLLER

Many members of the Microchip PIC microcontroller family support in-circuit programming using a serial programming algorithm. The ASERSM1A allows the connection of a supported PIC microcontroller by attaching the required programming signals to the corresponding pins on the selected PIC part. The signals required to support the PIC serial programming mode follow: SCLK, SDAT, Vcc, GND and Vpp. These signals are provided at the left pin group which is marked (PIC). **NOTE:** To allow this group of pins to support both the MicroWire (93XX) and the PIC devices, the PIC connections reference the group as 10 pins (0 through 9) instead of 8 (1 through 8) which is used for serial eeproms. The PIC programming functions map to the following pin numbers/colors: (SCLK/PIN#1/BRN), (SDAT/PIN#3/ORN), (Vcc/PIN#7/VIOLET), (GND/PIN#9/WHT), (Vpp/PIN#8/GRY).

**NOTE:** Refer to the Microchip serial programming information at [www.microchip.com](http://www.microchip.com).

### SERIAL EEPROM PIN ASSIGNMENTS



### PIC MICROCONTROLLER



1-SCLK 3-SDAT 7-Vcc  
8-Vpp 9-GND