AVR074: Upgrading AT90ICEPRO to ATICE10

8-bit AVR® Microcontroller

Application Note

This document describes how to upgrade the AT90ICEPRO emulator to ATICE10 version 2.0.

Three integrated circuits must be replaced, one resistor removed, one 0Ω resistor (alternatively a wire) and four straps inserted. People with some soldering experience can easily do these modifications themselves.

Contact your local Atmel representative if you prefer to have your emulator upgraded by Atmel.

Why Upgrade

Upgrading from AT90ICEPRO to ATICE10 as described in this document will add ATtiny15 support to your emulator. If ATtiny15 support is not needed this update is not required.

Before you Start

In order to perform this upgrade the AT90ICEPRO to ATICE10 Upgrade Kit must be purchased from your local Atmel representative. This kit contains the following components:

- Insulated wire.
- 0Ω SMT resistor (0603).
- Three integrated circuits (PLCC 44 package) marked A9601A1 111U105, A9601A1 104U103, A9601A1 Y1U149.
- ATtiny15 pod.

The following tools are required to perform the upgrade:

- ESD-safe workstation.
- Soldering iron with small tip.
- Solder.
- Desoldering braid.
- Pliers.
- Cutter.
- Pozidrive No.1 screwdriver.
- Scalpel or similar (for scraping off the solder resist).
- PLCC extractor tool.

ESD Precautions

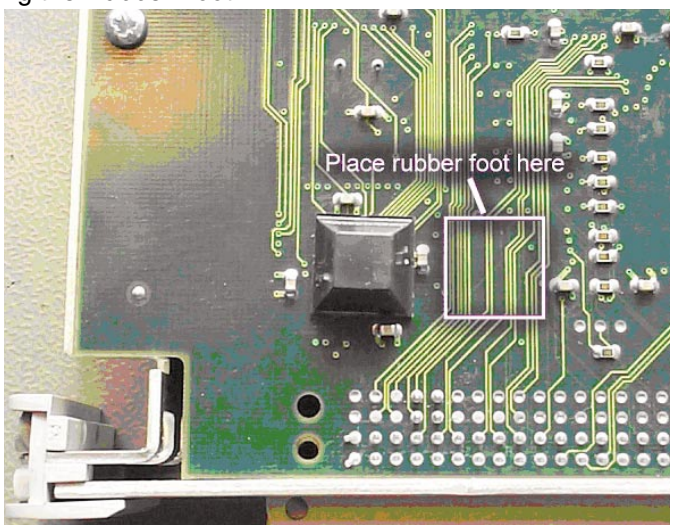
This work must only take place on an ESD-safe workplace. The AT90ICEPRO contains ESD sensitive components that may be damaged if not handled correctly.

Rev. 2420B–AVR–05/02

Placing the Straps

Remove the bottom lid of the AT90ICEPRO emulator by removing the two lower most screws on each side. Place the emulator with the bottom up and the POD connector facing towards you. The lower left rubber foot must be moved approximately two centimeters (3/4-inch) to the right. See Figure 1.

Figure 1. Moving the Rubber Foot



The first strap should be soldered between a via on the PCB and the POD connector pads. Gently scrape off the solder resist lacquer on the PCB track and via as shown on Figure 2 and Figure 3. **Be VERY careful not to cut the PCB track/damage the via**. Apply solder to the via/track and remove excessive solder with the desoldering braid.

Figure 2. Detail Showing the Via and Track Placement on the PCB

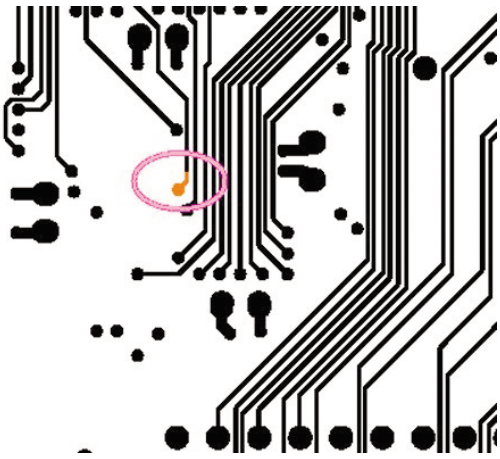
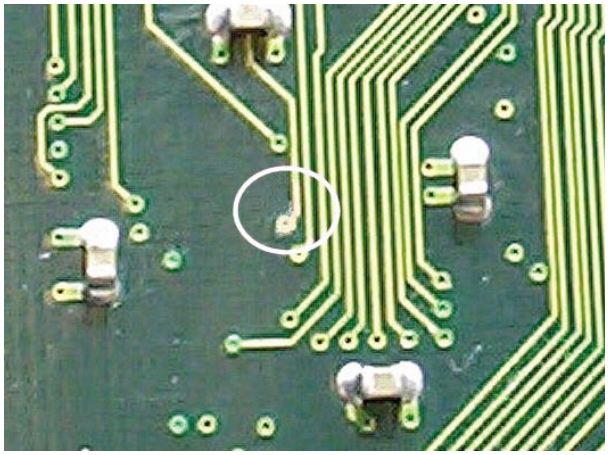


Figure 3. Picture Showing the Via and Track after the Solder Resist has Been Scraped Off



Cut a wire, approximately 25 mm long and remove the insulation two mm from each end. Solder the wire from the via to the third pad from the left on the second row of the pod connector pads. See Figure 4 and Figure 5. Due to the small via holes filled with solder resist the wire can not be put into the via hole, but must be soldered on top of the via.

Figure 4. Detail Showing the Placement of the First Strap

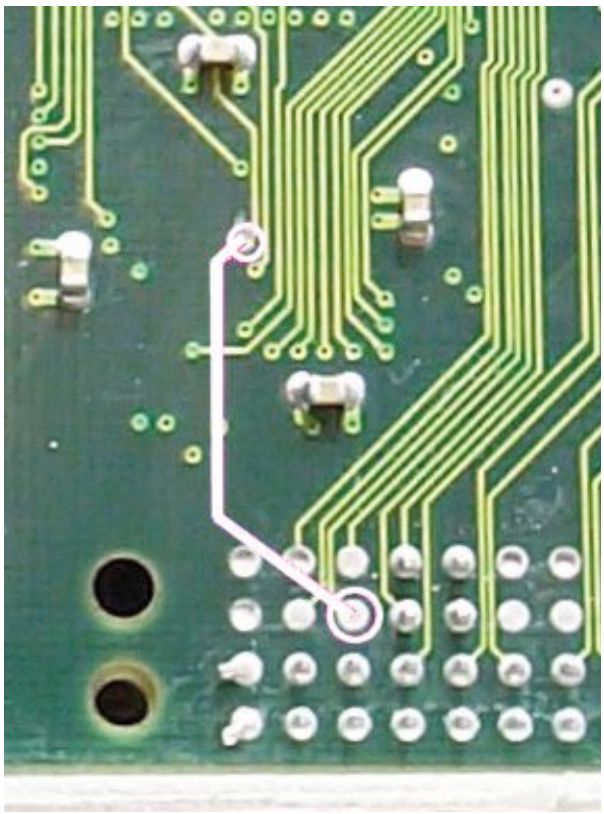
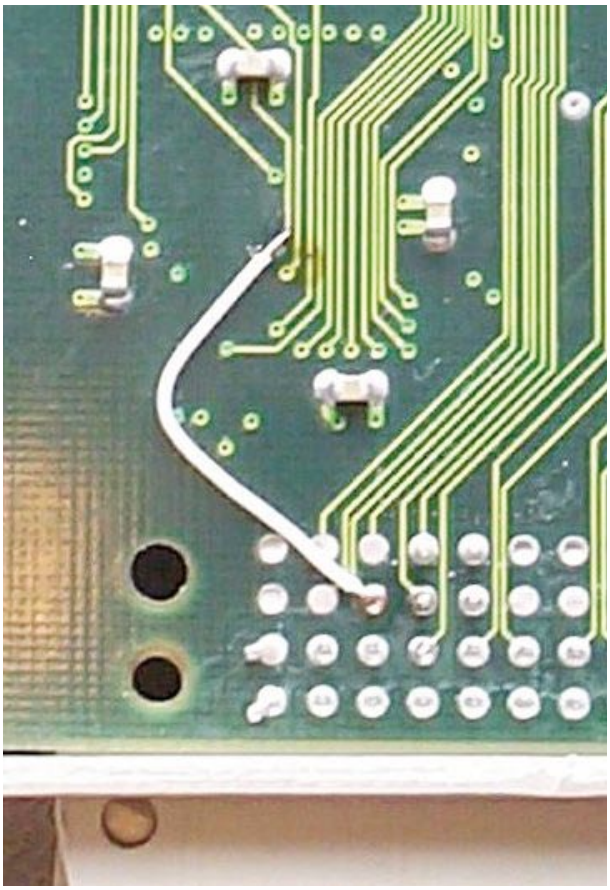
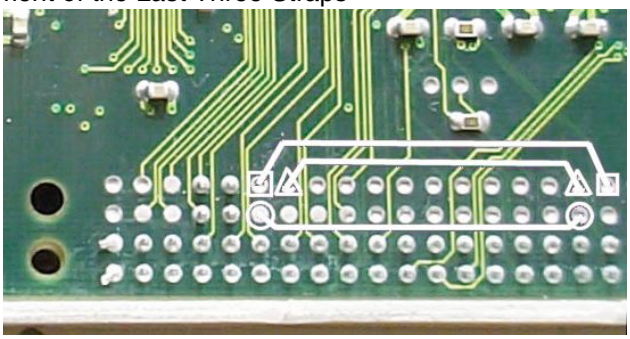


Figure 5. Correctly Mounted Strap



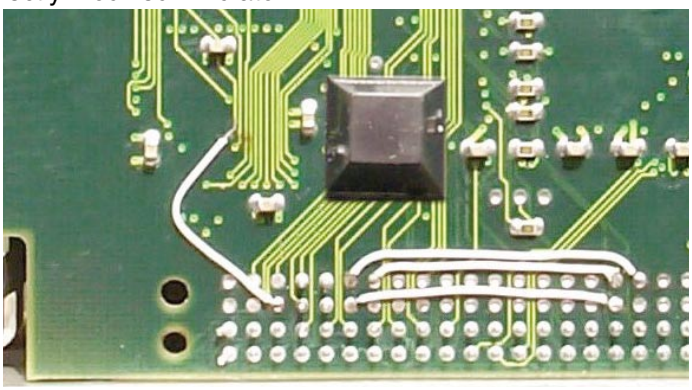
The placement of the three last straps are shown in Figure 6. All the pads are 1.0 mm holes, which have been filled with solder during production. If necessary, use a desoldering braid to remove excessive solder before mounting the straps. Alternatively melt the solder already present and put in the wire ends. If the last method is used, the wire ends should first be coated with solder, and preferably the pads wetted with a non-corrosive solder flux. Mount all three straps as shown in Figure 6. Make sure not to overheat the pads. The tracks on the PCB are thin and they are easily broken.

Figure 6. Placement of the Last Three Straps



Check that all wire ends are soldered correctly and that there are no short circuits between the wire ends and the adjacent pads. Figure 7 shows an emulator that has been correctly modified. Mount the bottom lid of the emulator after verifying the placement of the straps.

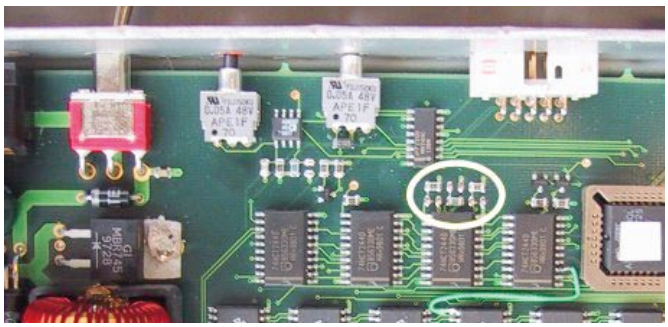
Figure 7. Correctly Modified Emulator



Changing the Hardware Code

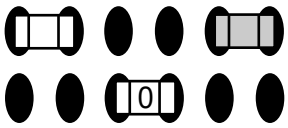
The AT90ICEPRO and ATICE10 have different hardware version codes. Therefore, the hardware version code of the AT90ICEPRO must be changed to match that of ATICE10. This is done by removing one resistor and adding a 0Ω resistor (alternatively a wire strap). Remove the top lid of the emulator by removing the two upper most screws on each side. Place the emulator with the pod connectors towards you. Figure 8 shows where the hardware revision code resistors are placed.

Figure 8. Placement of Hardware Revision Code Resistors



On AT90ICEPRO, the resistors are arranged as shown in Figure 9.

Figure 9. AT90ICEPRO Hardware Revision Code

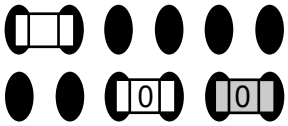


The right most resistor should be removed. Both pads of the resistor must be heated simultaneously in order to remove the resistor. The easiest way to do this is to use a wide tip on the solder iron that reaches both pads and heats them simultaneously. If such tip is not available, use the following method:

1. Add an excessive amount of solder to the tip of the desoldering braid. Place the desoldering braid beside the resistor so that it touches both pads.
2. Heat the desoldering braid with the solder iron (the desoldering braid should now act as a heat-transfer bridge between the solder iron and resistor pads).
3. Gently press the solder iron sideways. As soon as the solder on both pads melts, the resistor will slide off the PCB.

To set the hardware revision code to ATICE10 a 0Ω resistor should be soldered in the position indicated in Figure 10 (colored grey). If a 0Ω resistor is not available a 3 mm un-insulated wire may be used instead.

Figure 10. ATICE10 Hardware Revision Code



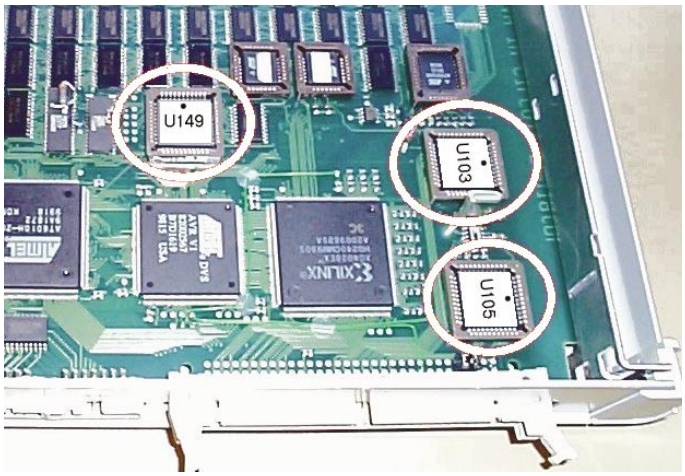
Replace ICs

The following ICs must be replaced:

- U149: replace with Y1U149 (marked A9601A1 Y1U149).
- U103: replace with 104U103 (marked A9601A1 104U103).
- U105: replace with 111U105 (marked A9601A1 111U105).

Figure 11 shows the locations of the ICs.

Figure 11. ICs Locations



Use the PLCC extractor tool to remove the ICs and gently press the new devices into their place. **Note the orientation**. Mounting the ICs with wrong orientation or in the wrong socket may permanently damage the emulator. The U149 should have its pin one marking towards the back of the emulator. The U103 and U105 should have their pin one marking towards the right side of the emulator. The pin one position is indicated with a black dot in Figure 11.

Make sure that the ICs are pressed all the way down in the socket.

Mount the top lid and connect the serial cable and power cable. Apply power to the emulator.

Load a project and open the info dialogue (help->about AVR studio... ->info). The HW revision should be 0x80 and the software revision 0x60.

To configure the ATICE10, load the ICEPRO/AVRICE/ICE10 Configuration system available in AVR Studio® 3.5 or later. You may now select support for up to six devices that can be loaded into the emulator.

This concludes the AT90ICEPRO to ATICE10 upgrade. For more information please contact your nearest Atmel distributor or avr@atmel.com.

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