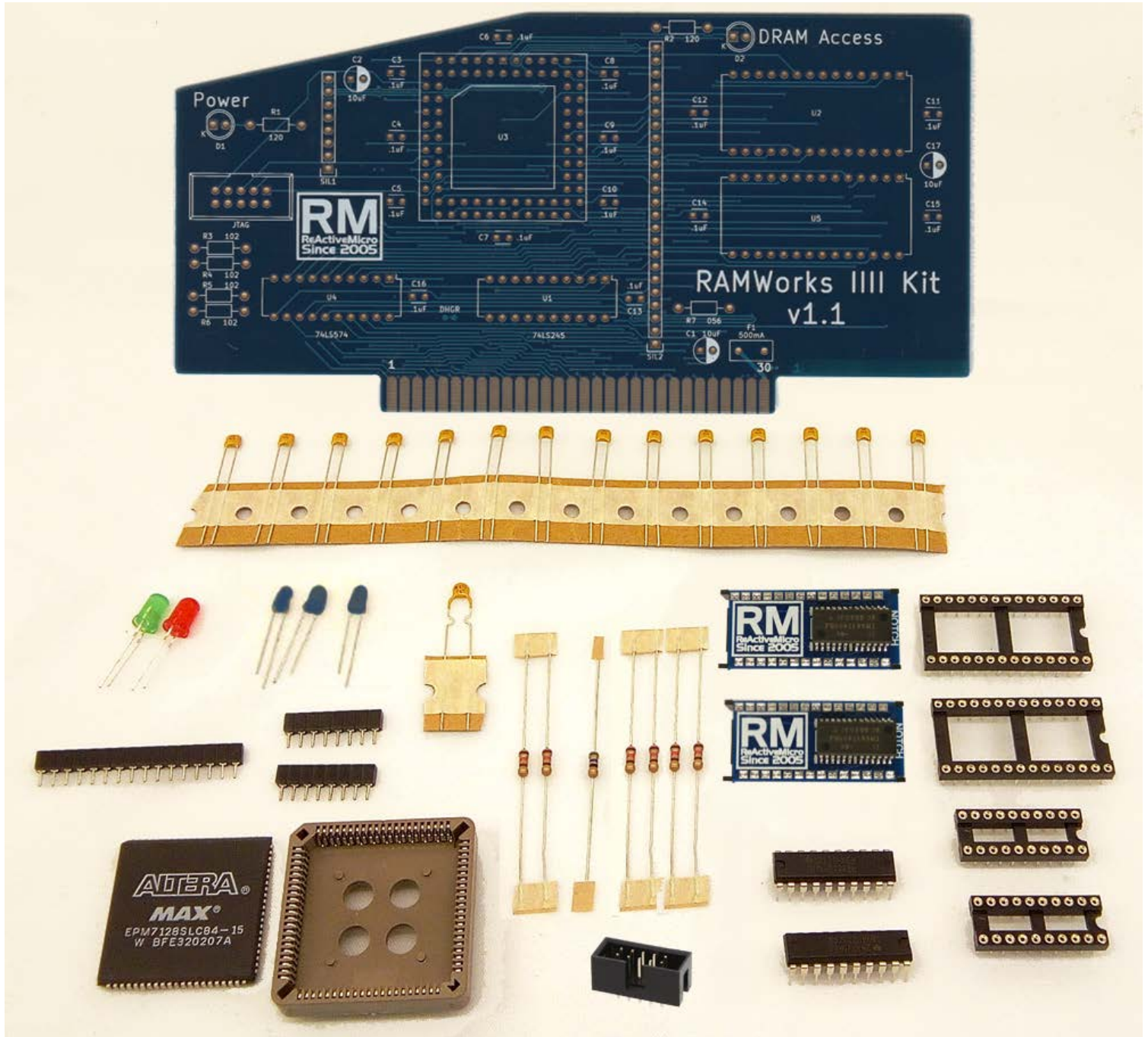




Apple II

RAMWorks III Kit v1.1 Assembly Guide

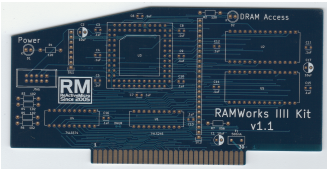

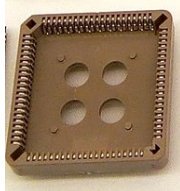
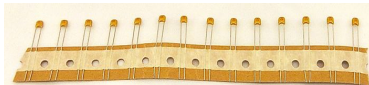

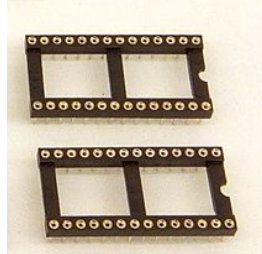
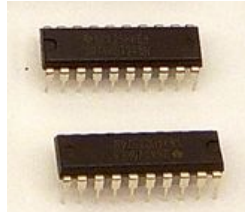
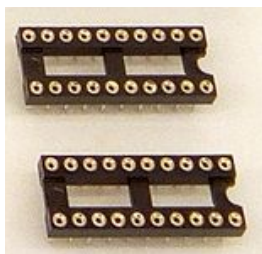



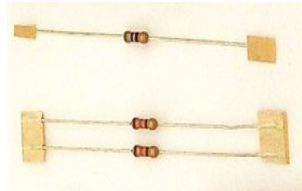
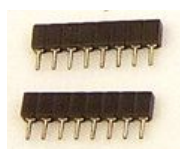

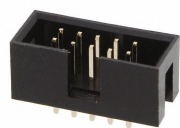



Features Of The RAMWorks IIII Kit:

- 100% RAMWorks III Compatible.
- Fully compatible in all Apple IIe and Euro IIe models.
- Gold Fingers for superior oxidation prevention and long life.*
- Tantalum and Ceramic Power Filtering Capacitors for longer life (4x minimum).*
- Resettable Fuse for short-circuit protection and to prevent damage to the Motherboard and RAMWorks IIII Card.*
- Power LED to show the board is receiving power and the Resettable Fuse is functioning correctly.*
- DRAM Access LED to show both read and write access to the RAMWorks IIII Card.
- PCB is fully marked with all part values to make assembly and repairs more simple.
- JTAG header included for those who want to experiment with their own CPLD projects.
- Lifetime Warranty (as with all ReActiveMicro products)*

* = Standard on ALL ReActiveMicro products. Safety and reliability are our Active goal!

The RAMWorks IIII Kit includes the following items:

			
RAMWorks IIII PCB	ALTERA CPLD	84-PLCC PGA Socket	14x .1uF Ceramic Power Filtering Capacitors
			
2x 4Meg x 4bit DRAMs	2x 28 Pin Machine Sockets	1x 74HCT245 1x 74HCT574	2x 20 Pin Machine Sockets
			
1x PTC Resettable Fuse	3x 10uf Tantalum Power Filtering Capacitors	1x Red LED 1x Green LED	1x 56-ohm Resistor 2x 120-ohm Resistor
			
2x 8 Pin RGB Header	1x 16 Pin RGB Header	2x10 JTAG Box Header	4x JTAG 10k-ohm Resistors

Tools Required: Soldering Iron and Related Accoutrements, Flux, Flux Brush (if paste flux), Pencil Eraser, Wire Cutters.

BEFORE YOU BEGIN:

These instructions assume you have basic soldering knowledge and common sense as not to kill yourself and burn down your home. This is only a “Guide” and your best judgement should always be used. Be sure to always use Flux even if your Solder has a Flux Core.

Note: Square Pads denote “Pin 1”. A “Notch” is also denoted on the face of the PCB. All parts are installed on the “face” of the PCB unless noted.

Step 1: Clean ALL gold pads on the bottom of the PCB with an Eraser. A large, soft, “Magic Rub” is great for this type of work. You will also want to clean the RGB Header pads on the front of the PCB should you choose to install the headers. These are labeled “SIL1” and “SIL2”.

Pro Tip: Using an Eraser to clean Pads makes soldering much easier and you will use less flux.

Step 2: Install 20 and 28 Pin DIP Sockets. Pay attention to the “Notch” and match to marking on PCB. You will notice a small flat marking near Pin 1 (Square Pad) on the PCB that denotes the “Notch”. Add flux to Socket legs. You can also add additional flux to the pads on the rear of the PCB.

Pro Tip: Lay the PCB on its face on a flat surface with the Sockets installed can help aid in assembly. Or solder a couple pins on each socket to tack them in place, then lay the PCB on its face to assemble.

Step 3: Install the 84-PLCC Socket. Be sure once again to pay attention to the “Notch” and the “cut corner” on the PCB marking and 84-PLCC Socket. There is also usually an “arrow” or marking on the inside of the Socket to denote “Pin1”.

Step 4: Install the Fuse at location “F1” on the lower right of the PCB. Any orientation is ok.

Pro Tip: For the next few steps, you may want to load the board first, then using tweezers bend the legs out slightly to hold the parts in place so you can lay the board on its face and solder everything at once. This is much faster than one part at time.

Step 5: Install the 3x 10uF Capacitors at “C1”, “C2”, and “C17” locations. Note: The “+” side is denoted by a vertical line on the Capacitor, sometimes even a “+” sign, and the longer leg. The “+” side of the PCB is denoted by the solid white area and rounds pad (not square). Be sure to install these Capacitors correctly or they will be damaged and could rupture/explode.

Step 6: Install the Resistors. Each Resistor is marked on the PCB with an “R” number for their location. It is also followed by the Resistor’s value. For example “R1 120”. The LEDs require 120-ohm Resistors, and near the Fuse

requires a 56-ohm Resistor. Optional: Installed the JTAG Resistors and Header. The "Notch" on the Header should facing up as noted on the PCB. R3-6 are marked "102" which is 10k (the 3 digit code is the first 2 numbers with the last digit number of zeros added).

Pro Tip: Some users think the Power LED is too bright, however this is it's normal brightness. You can replace R1 with a 4.7k ohm resistor to dim the LED if desired.

Step 7: Install the LEDs. Note: LEDs have a "flat" side and/or a "short" leg for the "-" side. This is denoted on the face of the PCB by the letter "K", the Square Pad, and the LED marking also has a "flat" side. Usually Green is installed for the "Power" location, and Red for the "DRAM Access" location. Choice is yours however.

Step 8: Install the 14x .1uF Ceramic Power Filtering Capacitors.

Step 9: Optional - Install the RGB Header Socket Strips. These are installed on the REAR of the PCB in locations "SIL1" and "SIL2". If you don't have an AE RGB Card then you don't need to install the Socket Strips as they don't serve any other purpose.

Step 10: If other than No-Clean flux was used then be sure to clean the board to remove flux. Use an old toothbrush, dish soap, and hot water. Scrub the rear of the board at least twice. Rinse well. Use a hair dryer (5 mins at least) or canned air to blow out the board to fully dry it. Towel drying and leaving out overnight will also work. Be sure to reclean the Edge Connector (Slot Edge) with an Eraser to be safe that all contacts are clean and grease/flux free.

Step 11: Install ICs - BE SURE TO WORK WITH ICs ON STATIC SAFE SURFACE! Pay attention to the "Notches". IC names are noted on the PCB. DRAMs Adapters and CPLD should have the Logo facing up so it is readable. The DRAM also has a "Notch" on it to denote Pin1. The CPLD has a "cut corner" on the top left.

Pro Tip: Use the Eraser to clean the IC pins before installing, especially on the 84-PLCC CPLD. This will prevent issues and the need to possibly remove and reseat the IC. A soft bristle metal brush (brass for example) could also be used in place of the Eraser.

Also be sure to check each IC's pins are straight - especially on the CPLD. This makes successful mating with Socket much simpler.

If you need to remove the 84-PLCC CPLD you can use a small screwdriver, paper clip, or preferably a PLCC Extraction Tool. Removal however shouldn't be necessary unless a pin is dirty or the board is doing odd things. Sometimes removal isn't necessary and just applying pressure to the CPLD will help reseat it and make better contact.

Pro Tip:Recheck all ICs and Tantalum Caps are in correct locations and oriented correctly. This is the last chance to find errors and fix them before possibly damaging an IC. **If the Power LED doesn't light instantly when power is turned on then turn OFF the Ile as quickly as possible.** This means the fuse has tripped and something is wrong. Recheck the board, ICs, or contact Support for assistance.

Done! You can use AE's RAMWorks III tester to test the first Meg of the board. You will need the ReActiveMicro's RAMWorks IIII Tester or the tester on the AppleWorks Expander 4.5 disk to fully test the board however.

For a basic test, as long as 80 Column Mode works then so should the RAMWorks IIII Card. Enjoy 4Meg of Auxiliary RAM in your IIe!

Thanks To The Following For Their Help With This Project:

Joe "8 Bits Are All You Need" Strosnider - Doc review and demo video.

Chris "I'd Love To Review This Kit (sigh)" Torrence - Doc review and demo video.

Geoff "Refresh Every Cycle" Body - Feedback and Sanity Check

Plamen "I Donno But Mine Works" Vaysilov - Answering Inane Questions

Everyone throughout the years who donated equipment.

Woz for making the Apple II computer and giving us something fun to learn on.

The Apple II and III Community - For 10+ years of their continued support and trust.

From The Mind Of: Henry "I'm Starting To Hate 4Meg DRAMs" Courbis