

# *ROM X<sub>e</sub>* *Apple IIe*

## Installation Guide

Revision 1.1 – September 2021

Dean Claxton, Jeff Mazur

## Contents

ROMXe Package.....	2
ROMXe.....	3
ROMXce Video ROM.....	4
24 Pin Video ROM.....	4
28 Pin Video ROM.....	4
Motherboard Layouts.....	5
ESD Prevention .....	9
ROMXe Preparation.....	10
ROMXe Installation.....	12
ROMXe Removal.....	13
Testing .....	14
Installation Examples.....	15

## ROMXe Package

Thank you for purchasing ROMXe! We hope that you have some fun playing around with different ROM images, and maybe even have a go at ROMifying some utilities/games/applications to share!

There are three printed circuit boards in the ROMXe bundle that you have received: the main ROMXe board, the ROMXe EF Adapter board with EF-Link cable, and the ROMXce 24 pin (or 28 pin) Video ROM board. The package should also include a 20cm ROM-Link cable for interconnection of the ROMXe module and Video ROM, a CR1220 battery for the Real-Time Clock, and a card with a QR code link directly to our web site.

We will be sharing tools, ROM images, and related documentation there (<https://theromexchange.com>) – be sure to check the site regularly for updates.

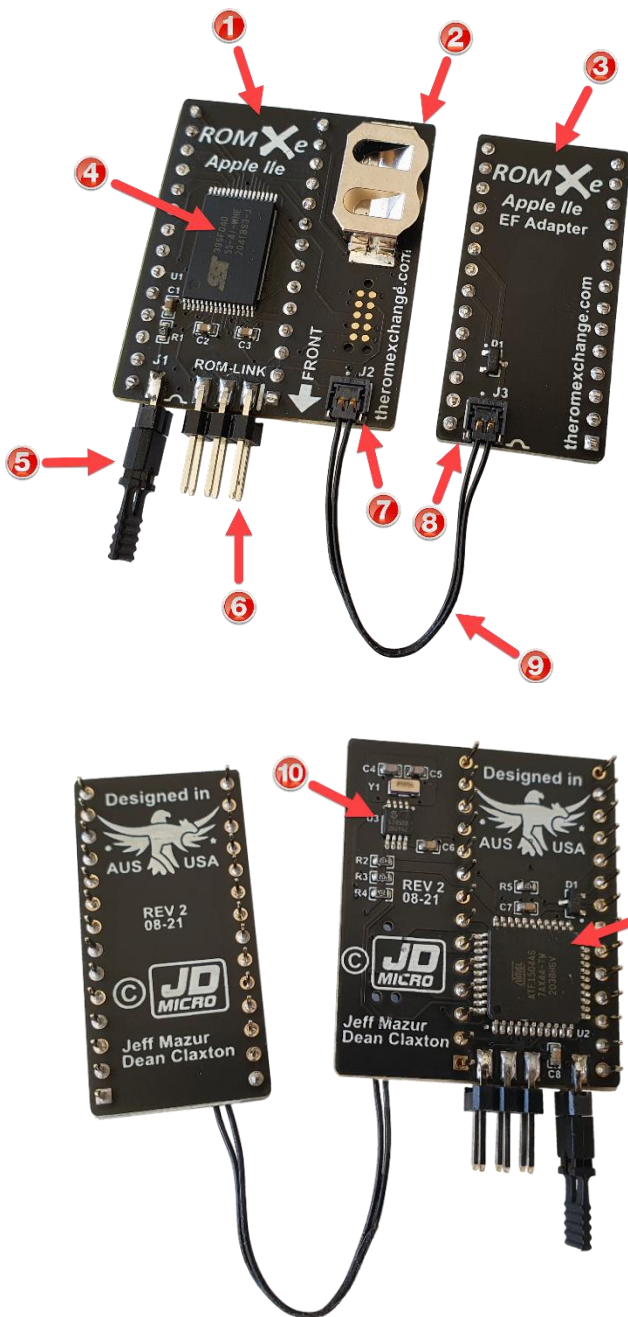


Before removing your ROMX modules from the ESD compliant packaging, please study the ESD Prevention section of this installation guide.

ROMXe

When the Apple IIe was first produced, the 16KB System ROM was stored in two 8KB ROM chips. These are known as the CD ROM (\$C100-\$DFFF), and the EF ROM (\$E000-\$FFFF). Later, when the Extended Keyboard or Platinum Apple IIe was produced, the 16KB System ROM was stored in a single 16KB ROM chip known as the CF ROM (\$C100-\$FFFF).

ROMXe was designed to support both single and dual ROM socket configurations – the main ROMXe printed circuit board (PCB) is used alone for single socket (CF ROM) motherboards, and used in conjunction with a ROMXe EF Adapter PCB for dual socket (CD, EF ROM) motherboards. In the dual socket configuration, an EF-Link cable is used to connect the ROMXe EF Adapter PCB to the main ROMXe PCB.



1. ROMXe Printed Circuit Board (PCB).
2. Battery holder for CR1220 RTC backup battery.
3. ROMXe EF Adapter PCB.
4. 4Mbit flash memory chip.
5. Recovery jumper.
6. ROM-Link header – Pin 1 end (white bar on PCB).
7. EF-Link J2 header.
8. EF-Link J3 header.
9. EF-Link cable.
10. RTC (Real-Time Clock).
11. CPLD (Complex Programmable Logic Device).

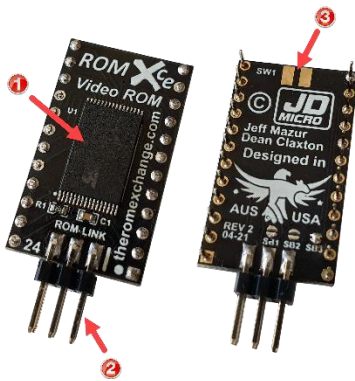
## ROMXe Video ROM

The ROMXe video ROM is loaded with 32 different fonts including both stock enhanced (MouseText) and unenhanced (no MouseText) fonts. The font list is covered in the user guide and is divided into 2 banks of 16 fonts. Bank selection is via external switch and the ROMXe menu system allows selection of a font from the active bank to be used as the system default, or associating a particular font with a ROM image. The video ROM connects to ROMXe via the supplied 20cm ROM-Link cable.

Two versions of the ROMXe Video ROM exist to accommodate different motherboard versions – one for 24 pin and one for 28 pin video ROM sockets. Each ROMXe version has a slightly different mechanism for bank selection.

### 24 Pin Video ROM

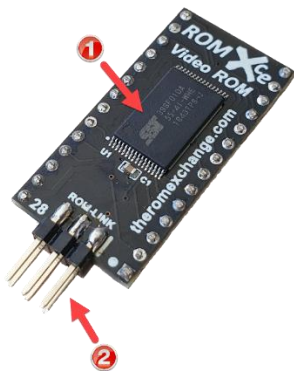
Bank selection is via a user installed switch or jumper on the SW1 pads.



1. 1Mbit Flash Memory.
2. ROM-Link Header – Pin 1 end (white bar on PCB).
3. Connection pads for external keyboard switch.

### 28 Pin Video ROM

Bank selection is via the stock keyboard switch fitted to the underside of the keyboard.



1. 1 Mbit Flash Memory.
2. ROM-Link Header – Pin 1 end (white bar on PCB).

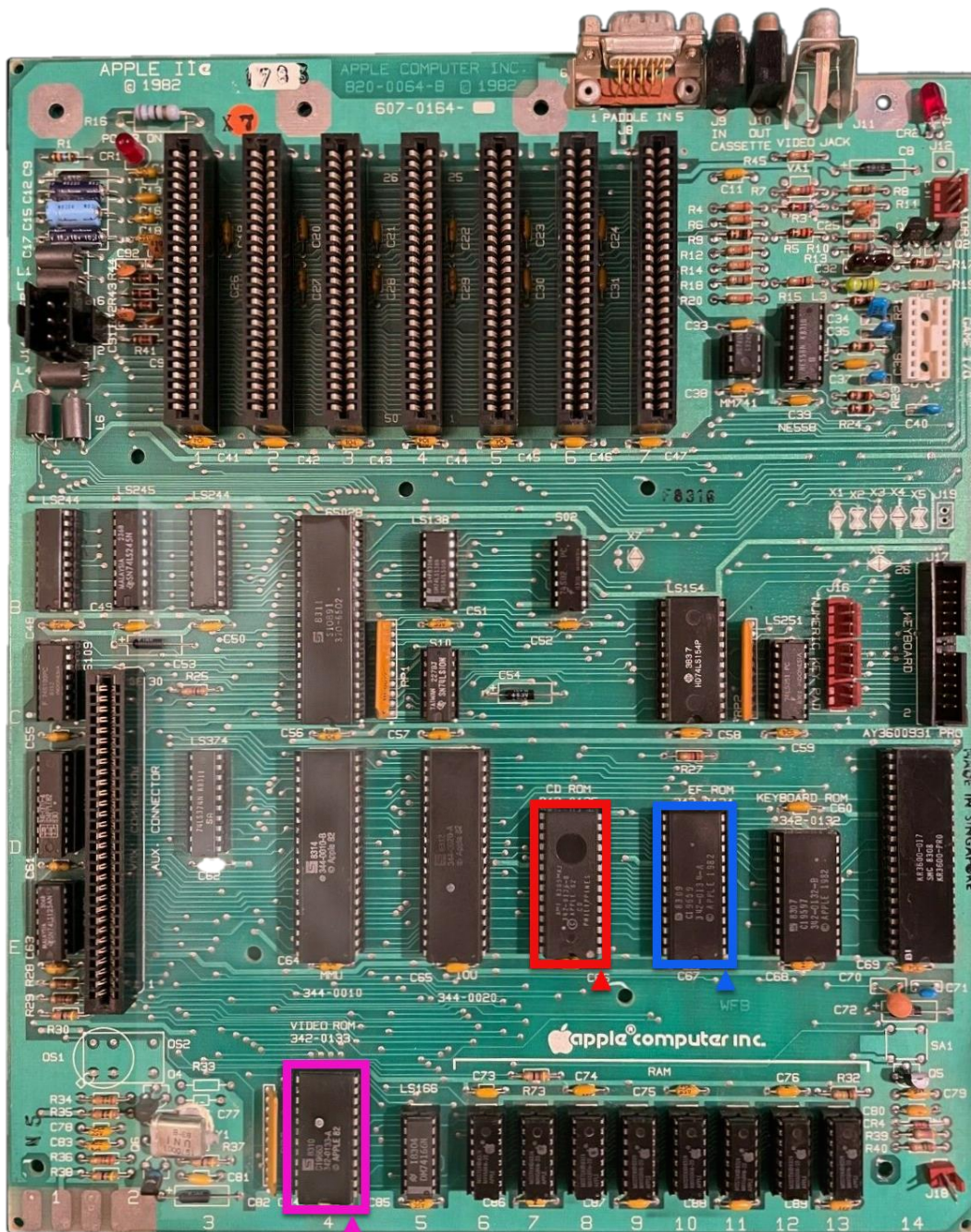


## Motherboard Layouts

Broadly speaking, there were 4 motherboard layouts used in the Apple IIe series. You will need to identify which board type you have so that you can determine where the ROMXe modules will be installed, whether you will need to use the ROMXe EF Adapter PCB, and which version of Video ROM is required (24 pin or 28 pin).

**Type 1** : Typical US non-Platinum motherboard layout. CD ROM (Red) and EF ROM (Blue) with 24 pin Video ROM (Purple).

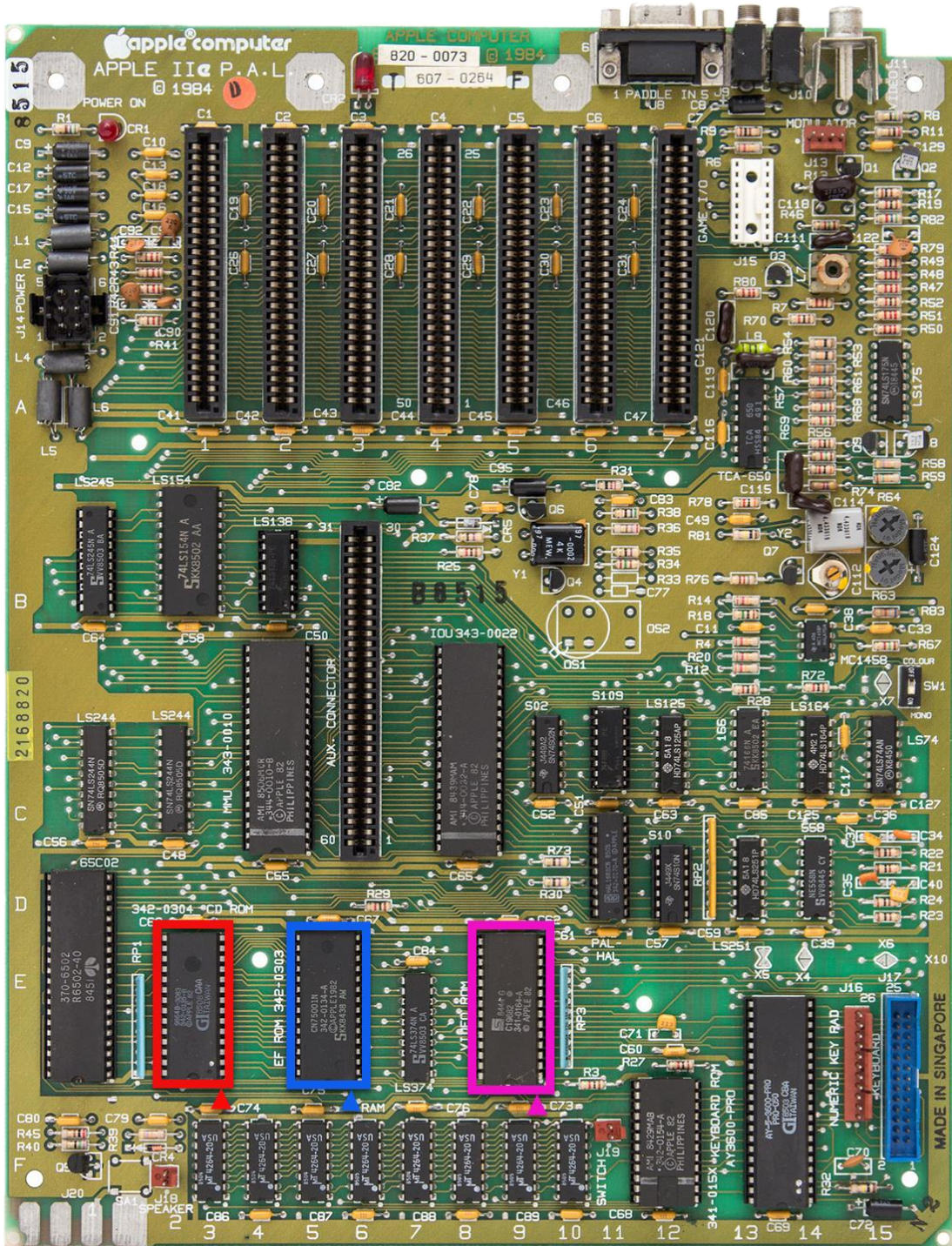
ROMXe will be installed in the CD ROM Socket, and the ROMXe EF Adapter in the EF ROM Socket. The 24 Pin ROMXce video ROM is used, and a switch can be connected to toggle a second bank of fonts.





**Type 2** : Typical European non-Platinum motherboard layout. CD ROM (Red) and EF ROM (Blue) with 28 pin Video ROM (Purple). A 28 pin Video ROM is used, as the machine will typically have a second character set stored in the video ROM, selected by using a factory installed switch underneath the keyboard.

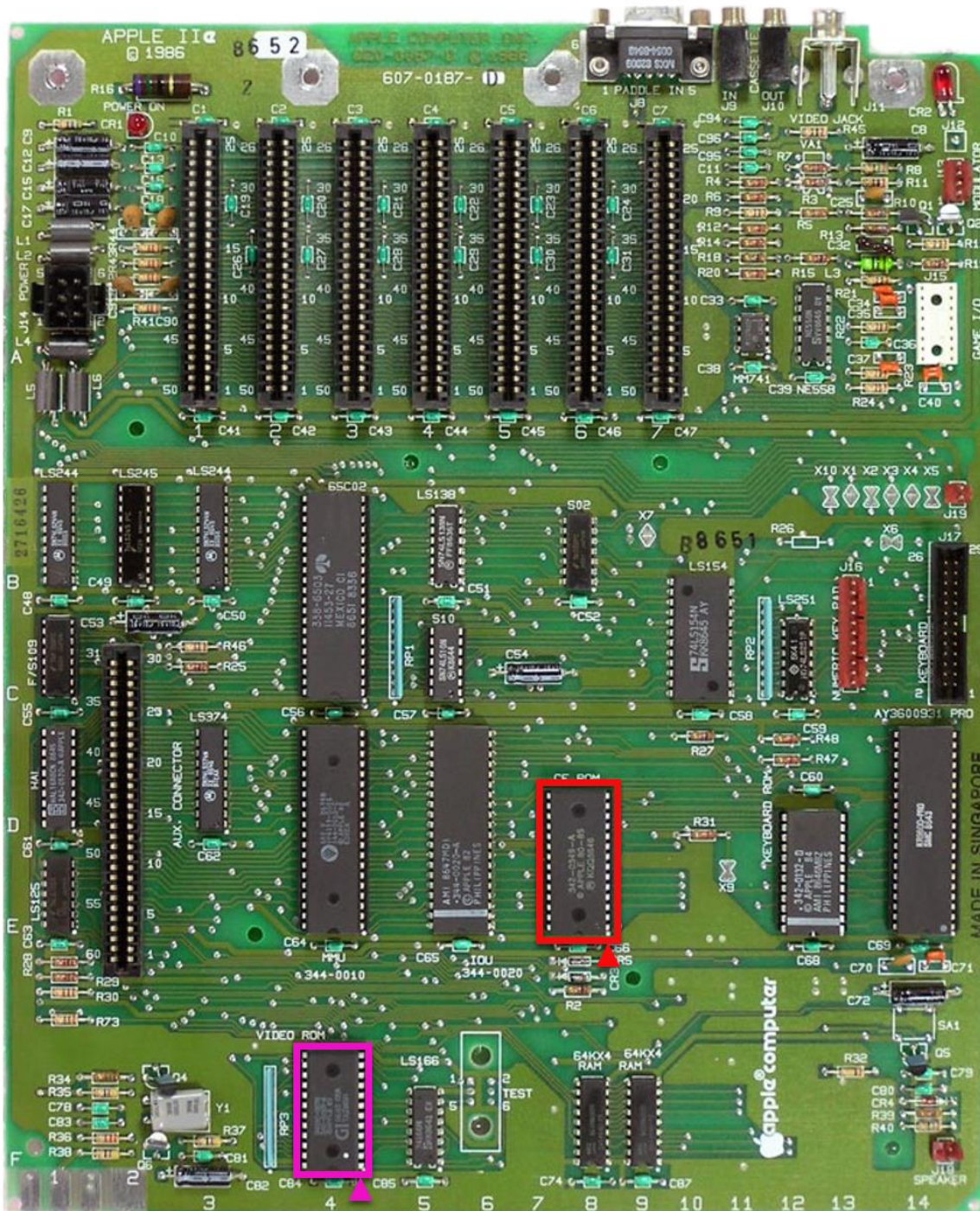
ROMXe will be installed in the CD ROM Socket, and the ROMXe EF Adapter in the EF ROM Socket. The 28 Pin ROMXce video ROM is used and the stock keyboard switch will toggle a second bank of fonts.





**Type 3** : Typical US Extended Keyboard/Platinum motherboard layout. CF ROM (Red) with 24 pin Video ROM (Purple).

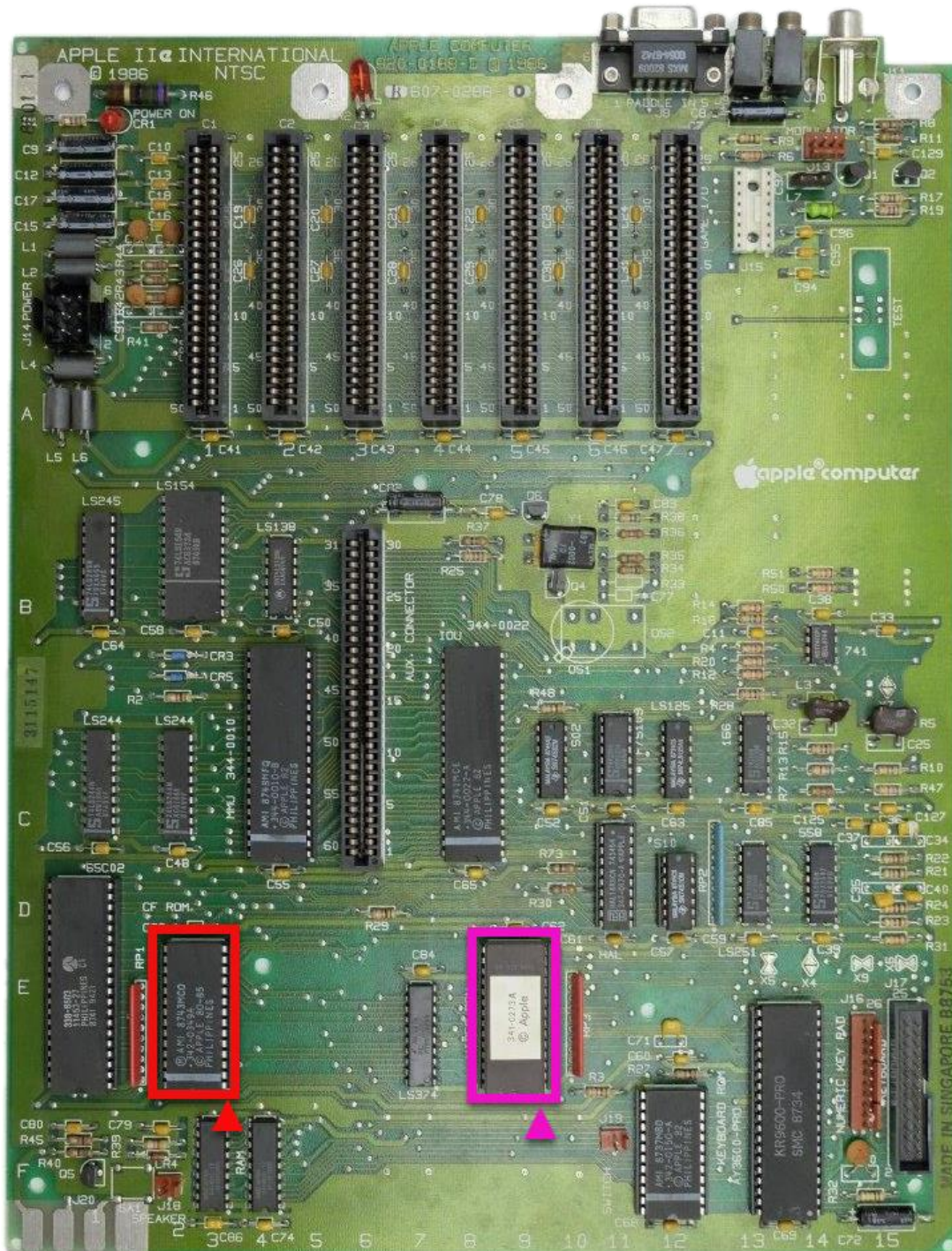
ROMXe will be installed in the CF ROM Socket. The ROMXe EF Adapter is not used and should be disconnected from the ROMXe PCB. The 24 Pin ROMXce video ROM is used, and a switch can be connected to toggle a second bank of fonts.





**Type 4** : Typical International European Keyboard/Platinum motherboard layout. CF ROM (Red) with 24 pin Video ROM (Purple). A 28 pin Video ROM is used, as the machine will typically have a second character set stored in the video ROM, selected by using a factory installed switch underneath the keyboard.

ROMx will be installed in the CF ROM Socket. The ROMx EF Adapter is not used and should be disconnected from the ROMx PCB. The 28 Pin ROMx video ROM is used and the stock keyboard switch will toggle a second bank of fonts.



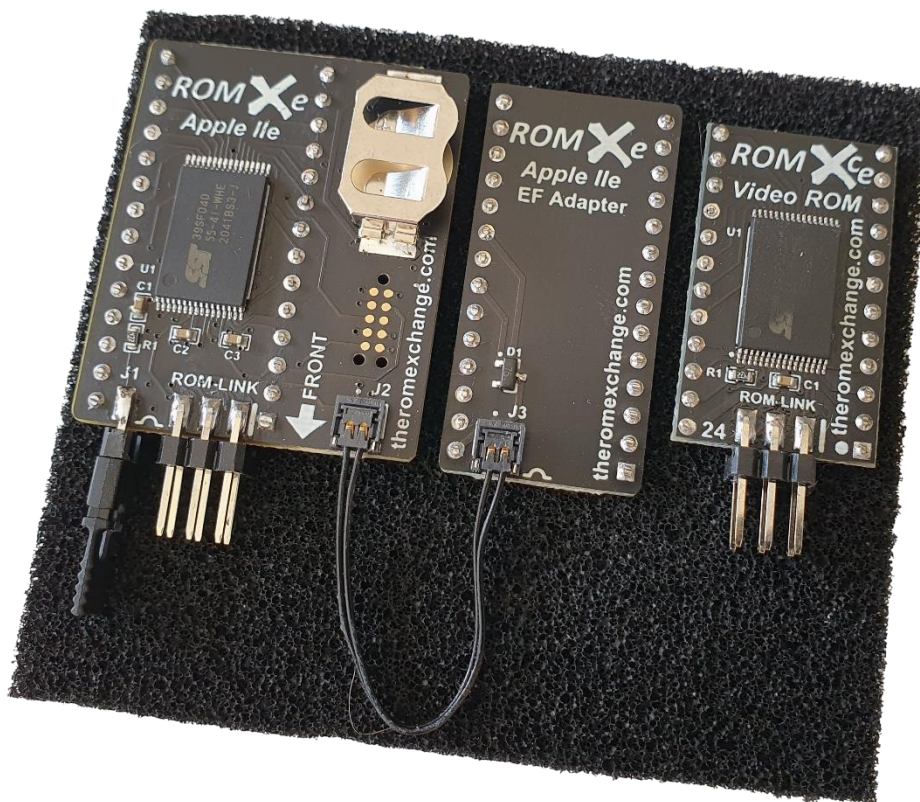
## ESD Prevention

Whenever you open an Apple II or other electrical device, you are exposing its internal components to potential damage from the static electricity that builds up in your body through normal activity. Electrostatic discharge (ESD) occurs when static electricity is discharged from one conductor (such as your finger) to another conductor (such as an integrated circuit).

Ideally, installation should be carried out on a static-safe surface such as a grounded anti-static mat, while wearing an anti-static wristband. If you have these available, be sure to use them.

Following the guidelines below will reduce the risk of ESD damage when installing the ROMXe module(s):

- Leave the ROMXe module(s) in the ESD-compliant packaging until you are ready to plug them in.
- Ensure that the computer is turned off but leave the power cord connected to a grounded outlet. Even with the power turned off, the power cord acts as a ground for the computer system, protecting it from static electricity.
- Before removing the module(s) from the ESD-compliant packaging, touch the metal case of the Apple IIe power supply to discharge static electricity that may have accumulated on your body.
- Handle ROMXe modules by the edges of the PCB, not by the pins. Avoid touching the ROM-Link connector, the pins, or exposed components.



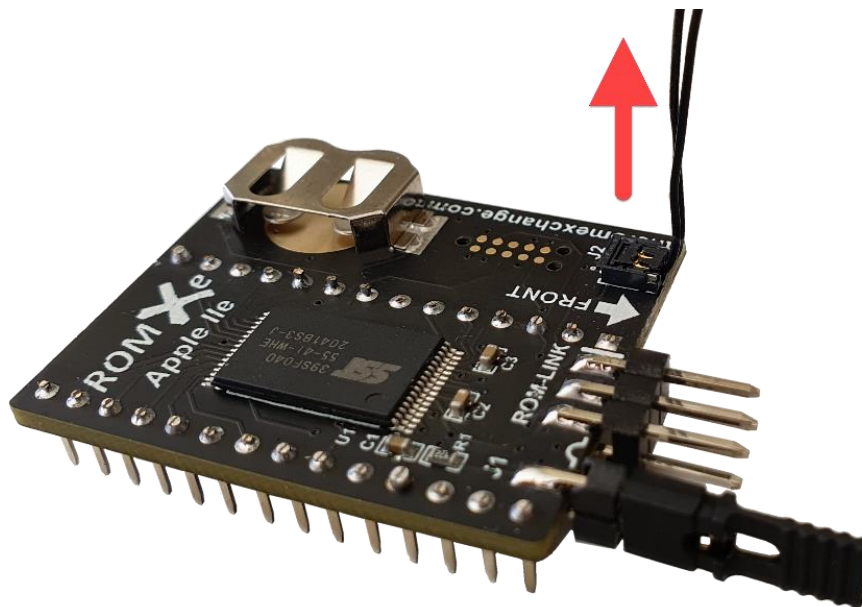


## ROMXe Preparation

After identifying whether your motherboard is a single or dual ROM socket configuration, prepare the ROMXe module for installation.

ROMXe is shipped with the EF Adapter PCB connected to the ROMXe PCB via the EF-Link cable. If you have a single CF ROM socket motherboard, the EF Adapter is not required and should be disconnected from the ROMXe PCB.

To disconnect the EF Adapter, grip the wires and gently pull the EF-Link cable directly upward :



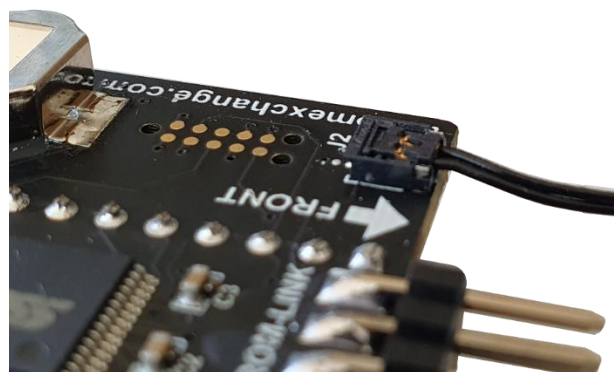
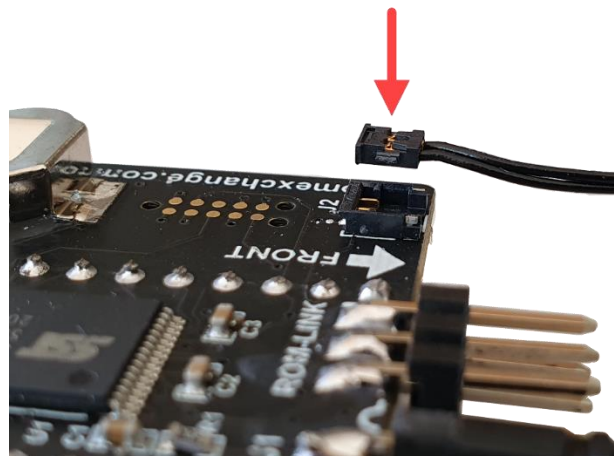
The EF link connector will disconnect from the J2 EF-Link header, and the EF Adapter PCB can be placed back in the conductive foam it was shipped in. Don't throw it out! You will need it if you ever want to move your ROMXe to a dual ROM socket motherboard.



If you should need to re-connect the EF Adapter for use in a dual socket machine, first identify the top side of the connector (this will face upward and is visible once the connectors are mated):



Then line the connector up directly above the socket, and apply light pressure to seat it. It should click into position :



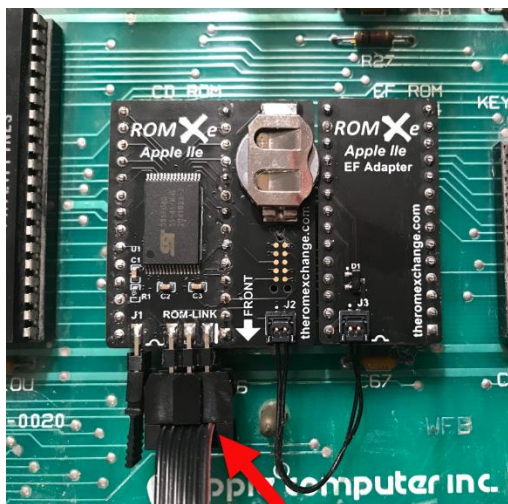
## ROMXe Installation

Once you know which modules you'll be installing, where they will be installed, and have read the ESD prevention guidelines, you are ready to begin installation.

1. Switch off the computer and remove the top cover.
2. Following ESD precautions and referring to the Motherboard Layouts section, remove the stock system ROM chip(s) and the stock Video ROM. This is easily accomplished using a small flat-bladed screwdriver. Starting at one end of the IC, carefully insert the screwdriver between the top of the IC socket, and the bottom of the IC. Gently lever the IC up just a little, then move to the other end of the IC and repeat the process. Continue levering the IC up a little at a time, alternating end to end until the chip is free of its socket. Do not try to lever it out in one go – doing so will likely bend the pins.
3. Following ESD precautions, remove the ROMXe PCB(s) from the ESD-compliant packaging and visually inspect the pins to ensure that none have been bent.
4. Install the CR1220 battery into the battery holder with the + sign facing upwards and attach the ROM-Link cable to the header - the red stripe on the cable (pin 1) should be located at the end of the ROM-Link header marked by the white bar on the PCB.
5. If you have a single ROM socket machine, skip ahead to step 6.

If you have a dual ROM socket motherboard, install the ROMXe EF Adapter PCB into the EF ROM socket on your motherboard. For US layout motherboards it is best to install this before installing the main ROMXe PCB. After ensuring that all pins are lined up with the EF ROM socket, press the ROMXe EF Adapter PCB into the socket.

6. After double checking that the battery is correctly installed and pushed back fully into the holder, position the ROMXe PCB above the motherboard socket. Check that all pins are lined up with the ROM socket, then press the ROMXe PCB into the socket. The red arrow shown below indicates the pin 1 end of ROM-Link. The red stripe on cable should go on this end.



7. Following ESD precautions, remove the ROMXce Video ROM module from the ESD-compliant packaging and visually inspect the pins to ensure that none have been bent. Attach the ROM-Link cable to the header - the red stripe on the cable (pin 1) should be located at the end of the ROM-Link header marked by the white bar on the PCB (red arrow below).
8. Ensure that all pins are lined up with the Video ROM socket, and install the ROMXce Video ROM module.



Don't throw out the ROMXe packaging! You can press the original IC's into the conductive foam and place them into the antistatic bag and box for storage.

Proceed to the Testing section.

## ROMXe Removal

ROMXe removal is accomplished in much the same manner as removal of the original ROM chips with one exception.

Since the ROMXe PCB has components on the underside of the PCB, take care when prying it from the ROM socket. Do not slide tools under the PCB as they could damage components.

For ROMXe, safe lifting points are the ROM-Link header itself, and the area at the opposite end of the PCB under the ROMXe logo.

The EF Adapter and Video ROM do not have components on the underside and are safe to remove in the usual manner.





# Installation Examples

