BOOK II

User Manual *(Quick Start)*

Document Revision 0.1

- This manual assumes the user already has experience with the Apple II or compatible computers.
- This manual covers the basic operation and technical features of BOOK II. For comprehensive technical details, please refer to the *BOOK II Technical Reference & Maintenance Manual*.

Overview

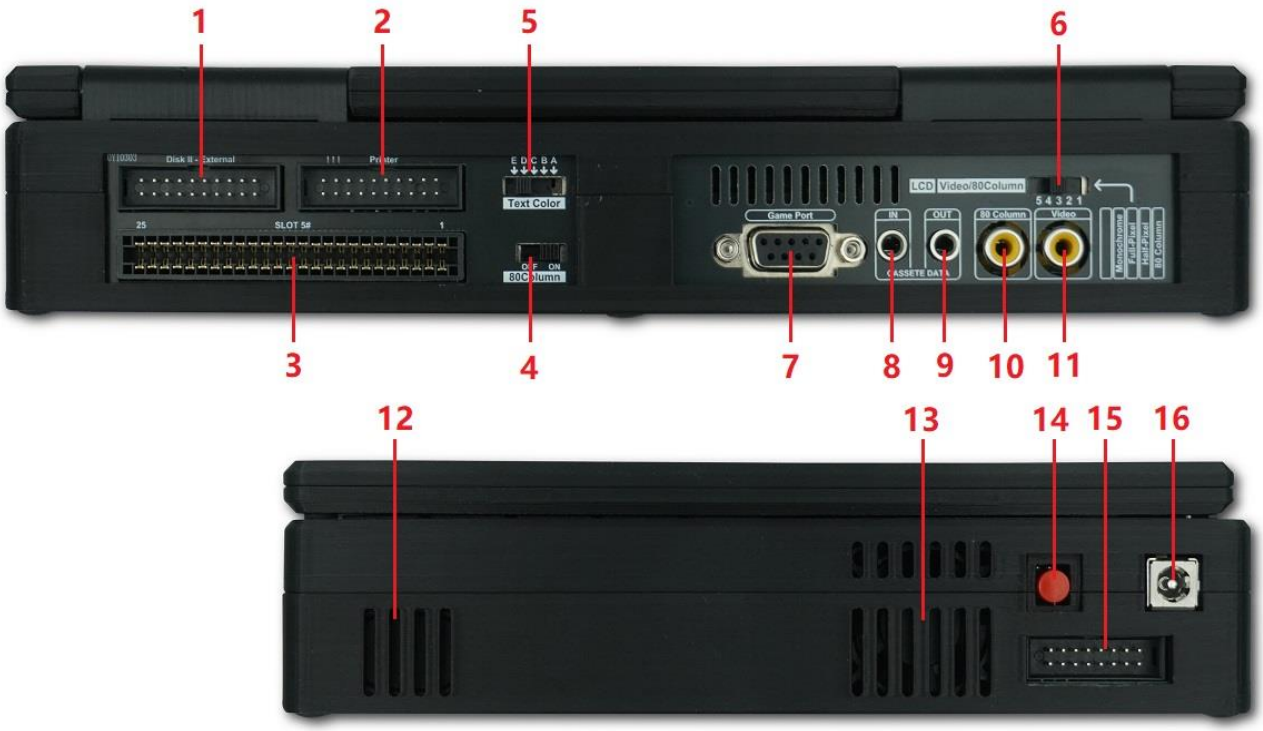
The BOOK II is a portable Apple II (Plus) compatible computer, redesigned using standard TTL chips and equipped with ROMs from early Apple II compatibles or clones. Beyond its core Apple II functionality, it integrates several built-in enhancements: an 80-column video card, a 16KB Language Card, a Z80 Softcard, a printer controller, and a Disk II compatible controller.

As a portable computer, the BOOK II features a built-in lithium battery, an RGB LCD, and a low-profile mechanical keyboard. It supports original Apple Disk II floppy drives as well as floppy drive emulators.

Features

- CPU: 6502
- SRAM: 48KB (+16KB)
- Z80 Softcard
- 80 Column Video Card
- 16KB Language Card RAM
- Disk II controller
- Printer Interface
- RGB Display
- Mechanical keyboard/
- Lithium battery (4x18650)
- Expansion Bus Support (Slot 5)

1. External interface

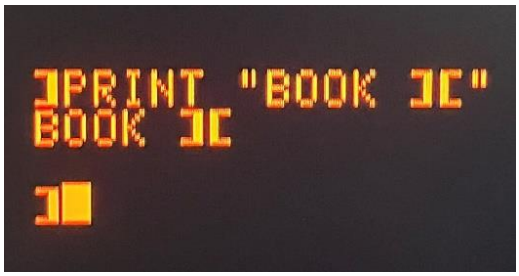


[1] 20Pin External DISK2 drive interface
[2] Printer Interface
[3] 50 pin system bus slot (Slot 5)
[4] Internal 80 column video card enable switch
[5] Text color selection switch
[6] RGB LCD control switch
[7] DB9 game control stick interface
[8] Cassette data in
[9] Cassette data out
[10] 80 column card video output
[11] Motherboard video output
[12] Speaker
[13] Cooling fan
[14] Power switch
[15] Game joystick interface
[16] Power adapter input (12V 3A)

2. Power on

- Before powering on, ensure that the RGB switch [6] is set to one of positions 2, 3, 4, or 5 (i.e., not the 80-column position).
- If using a DISK II floppy disk drive or a disk drive emulator, ensure the device is inserted or removed before powering on, and pay attention to the cable orientation. Both the Apple DISK II drive and common disk drive emulators should be inserted with the ribbon cable facing upward.

- As with the Apple II, after turning on the power switch, BOOK II will enter a disk-boot ready state; pressing FN+R or the Reset key will launch the built-in BASIC environment. The BASIC user manual is not covered in this guide.



3. Keyboard

The BOOK II keyboard features more keys than the Apple II, and its layout more closely resembles that of the Apple IIe. The functions of the additional keys are listed below.

DEL: It functions the same as the LEFT key and is treated as the Delete key in Apple II.

~ : This key is not present on the Apple II keyboard, therefore it has no function in AppleSoft BASIC. However, it still generates the correct scan code and will be properly recognized in systems like CP/M or other environments.

CAPS : The Apple II does not support lowercase letters, but the case-switching function is available in the CP/M system.

F1/F2/UP(↑) /DOWN(↓) : The Apple II keyboard has a total of 128 scan codes (0–127), and each of these four keys can be assigned to any one of them. When the settings window is opened by pressing FN+5, pressing FN+F1 will increase the scan code by 1, and pressing CTRL+F1 will decrease it by 1. The F2, UP, and DOWN keys can be defined using the same method as F1.

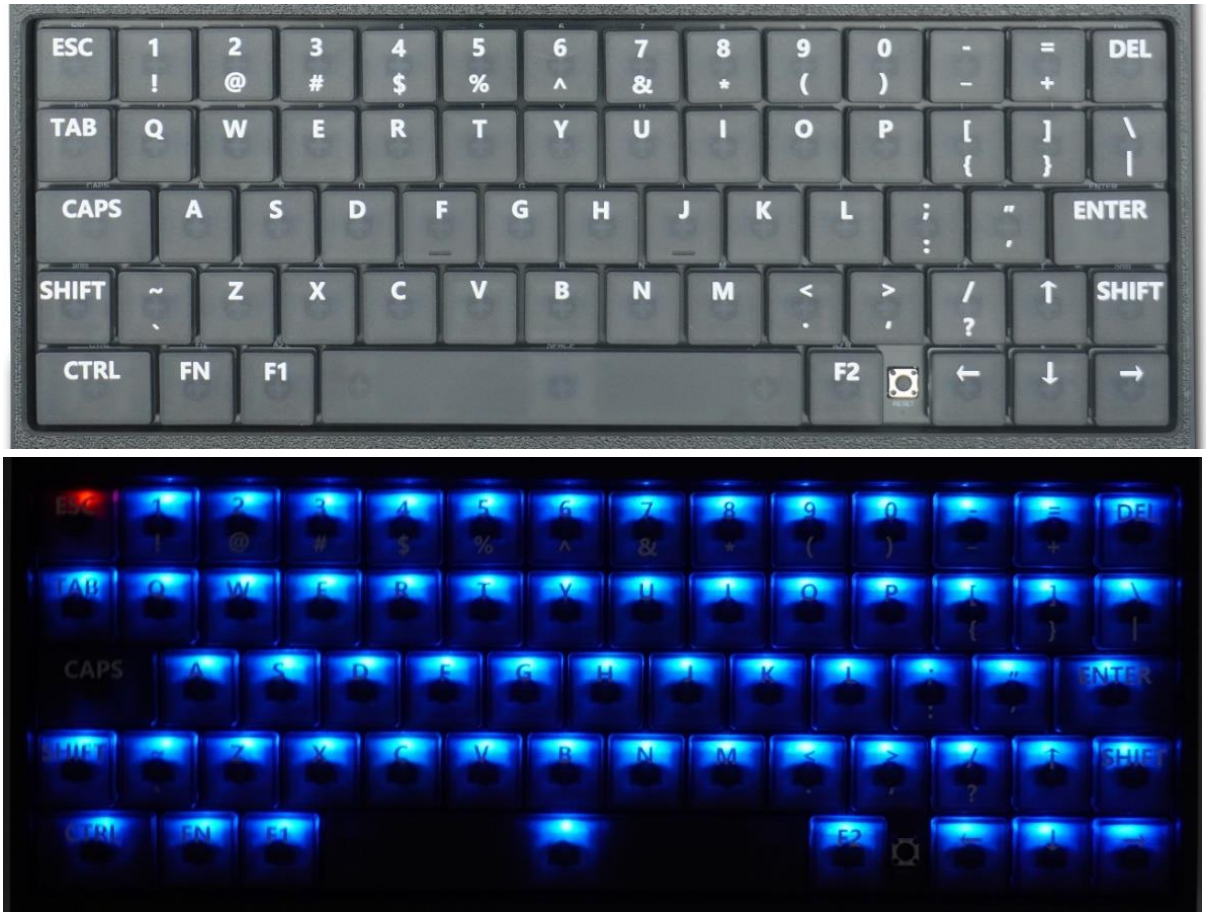
FN+3: Turn the keyboard backlight on/off

FN+5: OSD – Key Customization Menu (Press ESC to exit)

FN+R: Reset (Function is identical to the RESET button)

* The character keys on BOOK II auto-repeat when held, so a dedicated REPT key is not included.

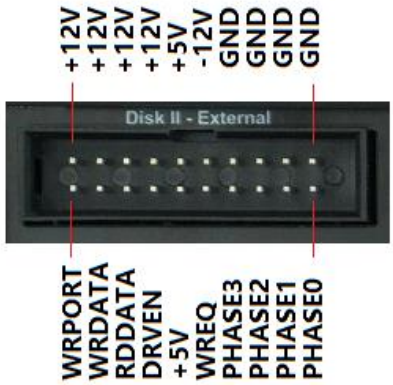
* The backlight for the ESC and CAPS keys is not controlled by FN+3.



4. Interface Definition

[1]. 20Pin External DISK2 drive interface

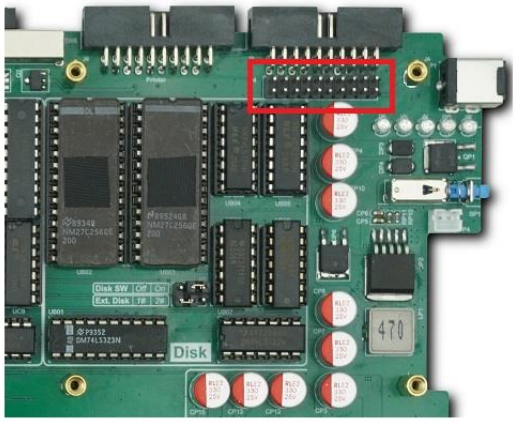
- This connector is driven by the internal DISK II Controller. A 20-pin ribbon cable can be used to connect either an Apple II Disk II drive or modern disk-drive emulators. A jumper on the mainboard selects whether this port functions as Drive 1 (default) or Drive 2.

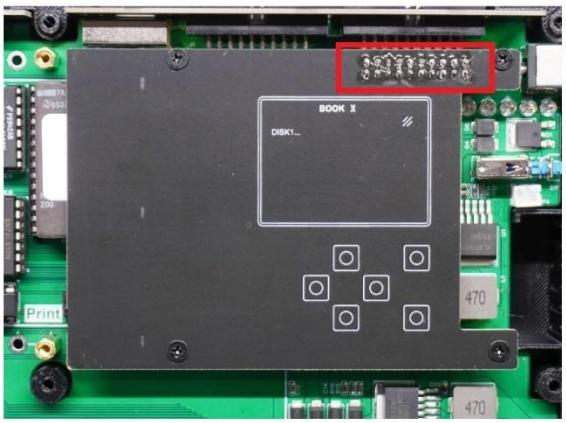


- Note that some Disk II drive cable connectors lack a polarization key. The cable must be inserted with the ribbon cable facing upward . Inserting it upside-down may cause permanent damage to either the BOOK II or the Disk II drive.

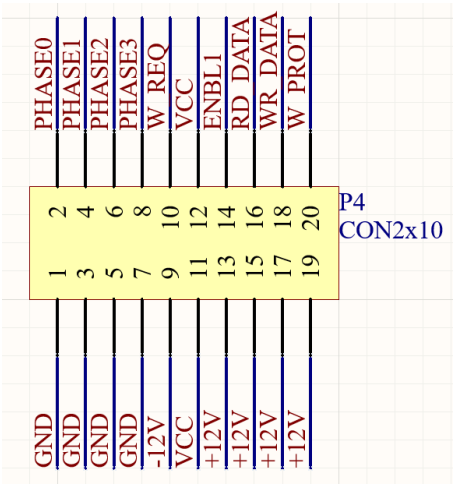
[2]. Reserved internal location for floppy drive emulator

- An additional connector is reserved inside the unit. Users with the technical capability to design a disk drive emulator can construct one according to the reference dimensions and mount it using the pre-installed screws.





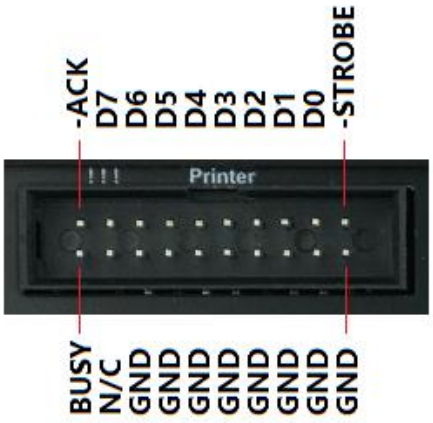
- Pinout for the built-in floppy drive interface



* The PCB source code file of the floppy drive demonstration board can measure the external shape and interface dimensions.

[3]. Printer Interface

- Printer Interface is a 20-pin IDC quick connector originating from the internal Printer Interface Card. It can be connected to a printer via a 20-pin ribbon cable with a CN36 header. BOOK II has only been tested with the OKI 5200F printer.



- IDC20－CN36 ribbon cable (P/N: BK2-IDC20-CN36)

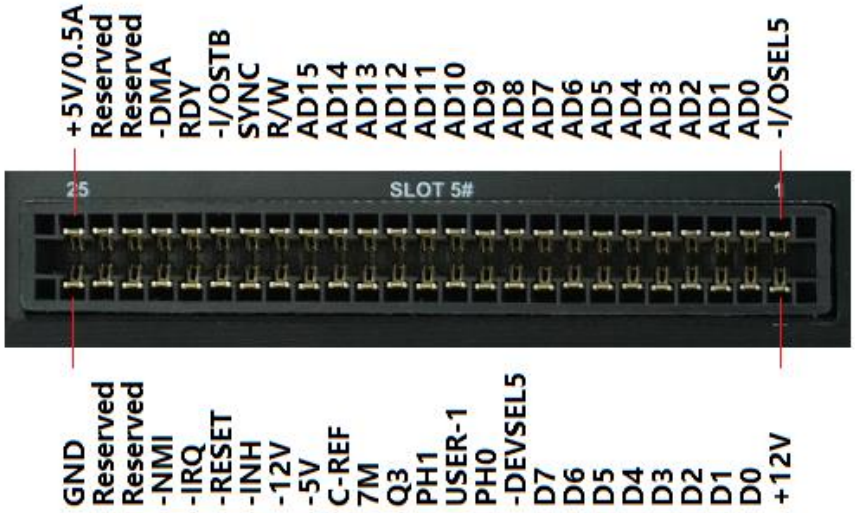
[3]. 50-pin Expansion Slot 5

The Apple II motherboard includes eight bus expansion slots for adding additional functionality. BOOK II directly integrates these common expansion cards. The corresponding slot numbers for the integrated cards are listed below:

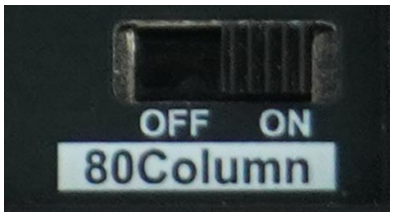
SLOT0: 16KB language card memory
SLOT1: Printer Interface
SLOT2: (Not used)
SLOT3: 80Column Video card
SLOT4: Z80 Softcard
SLOT5: Used for external expansion cards
SLOT6: Disk II Controller
SLOT7: (Not used)

The SLOT5 connector uses the same 100-mil pitch socket as the Apple II. This slot is provided for test signals only and must not be used with untested expansion cards. Note that the connector is not keyed to prevent incorrect orientation; it must be inserted with the component side facing upward.

(Pinout):



[4]. 80 column video card enable switch



The 80-column card enable switch is used to activate or deactivate the 80-column video card. This switch must be adjusted only when the unit is powered off.

- When the switch is set to OFF, the select signal for the 80-column card is disconnected from the SLOT3 connector, making the system behave as if the card is not present.
- With the 80-column video card activated, you can enter 80-column video mode from the BASIC environment by typing PR#3. The LCD controller switch must also be set to position "1" (labeled 80 Column). If using an external video monitor, ensure it is connected to the 80-Column video port. Some software automatically detects the presence of the 80-column card on startup and switches to 80-column mode; in this case, you must also confirm the LCD controller switch is in position "1". To prevent software from automatically entering 80-column mode, set the 80-column card enable switch to OFF before powering on.

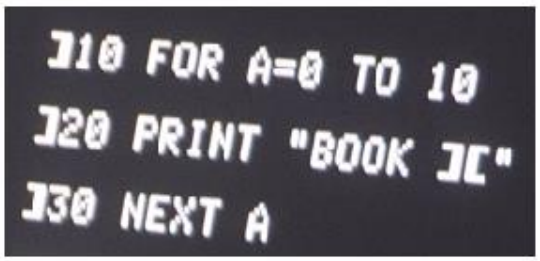
Note: After restarting the device or exiting 80-column video mode, the RGB control switch must be switched back to one of positions 2, 3, 4, or 5. Otherwise, the LCD will display no content.

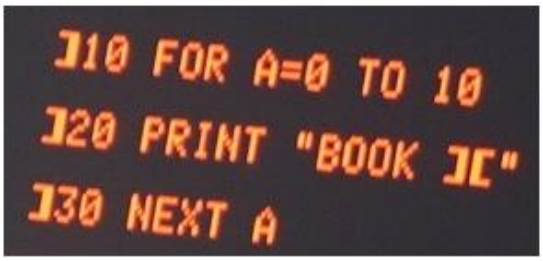
[5]. Text color selection switch

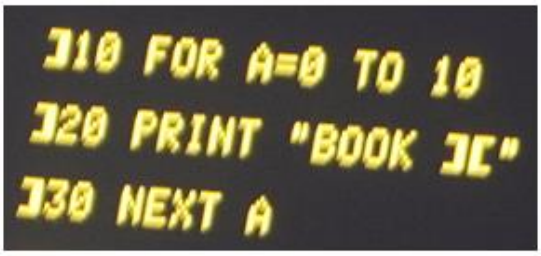
This switch is used to select the color of on-screen text. Except for graphic-based characters, text in all display modes will be rendered in the selected color. The text color is modified within the RGB controller circuit, so this function does not affect an external video monitor. The BOOK II motherboard itself is not controlled by this switch.

The following table lists the text colors corresponding to each switch position:

A-White B-Grey C-Green D- Orange E- Yellow







* If the LCD control switch is set to position "4" (Monochrome), the colors for both graphics and text in Hires mode are controlled by the text color selector switch.

[6]. RGB LCD control switch

This switch selects whether the LCD receives video signal from the motherboard or from the 80-column video card. When set to position "1", the LCD receives signal from the 80-column video card. If no software is utilizing the 80-column card at that time, the LCD will display no content. In positions "2", "3", "4", and "5", the LCD always displays signal from the motherboard; the difference between these positions is apparent only in Hires mode.

- Position“2”(Half-Pixel):

This is a highly practical mode. When connected to a color monitor, the Apple II can display six colors in High-Resolution (Hires) graphics mode. Based on the principles of NTSC color encoding, certain colors cannot appear in the same column, and each color pixel occupies two pixel units. As a result, graphics on a color monitor are not sharp, and text in graphics mode is often difficult to read. When connected to a monochrome display, the color-stripped graphics become much sharper, which is ideal for productivity software. The BOOK II’s Half-Pixel mode perfectly resolves the trade-off between color and sharpness. It masks the excess pixels, delivering graphics identical to a monochrome display while preserving color.

- Position”3”(Full-Pixel):

In Full-Pixel mode, the Hires graphics will appear exactly as they do on a color monitor, with pixel blocks displayed consecutively column by column. Since RGB pixels are significantly sharper than composite video pixels, gaps may appear between adjacent pixel blocks.

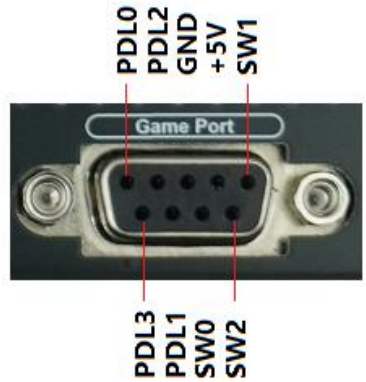
- Position”4”(Monochrome):

As the name suggests, in this mode, the color in graphics is filtered out, producing a display effect identical to that of an Apple II connected to a monochrome display. Additionally, the text color selector switch can be used to control the color of the graphics in this monochrome mode.

- Position”5”(Reserved)

[7]. DB9 game control stick interface

BOOK II's game controller port is identical to that of the Apple IIe. It can be used with the A2-JOY joystick, as well as any other controller compatible with the Apple IIe.



[8]. Cassette data in

[9]. Cassette data out

[10]. 80 column video card monitor output

The video signal from the 80-column video card will be output from this port.

[11]. Motherboard video output

The video signal on the BOOK II motherboard will be output from this port.

[12]. Speaker

[13]. Cooling fan

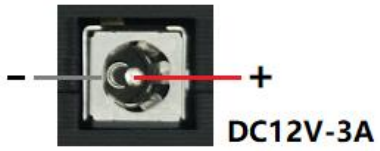
The cooling fan is controlled by the power module. It does not operate when the unit is powered by the battery. When the charger is connected and the unit is powered on, the fan will run continuously.

[14]. Power switch

[15]. Game joystick interface

Full-signal game controller interface

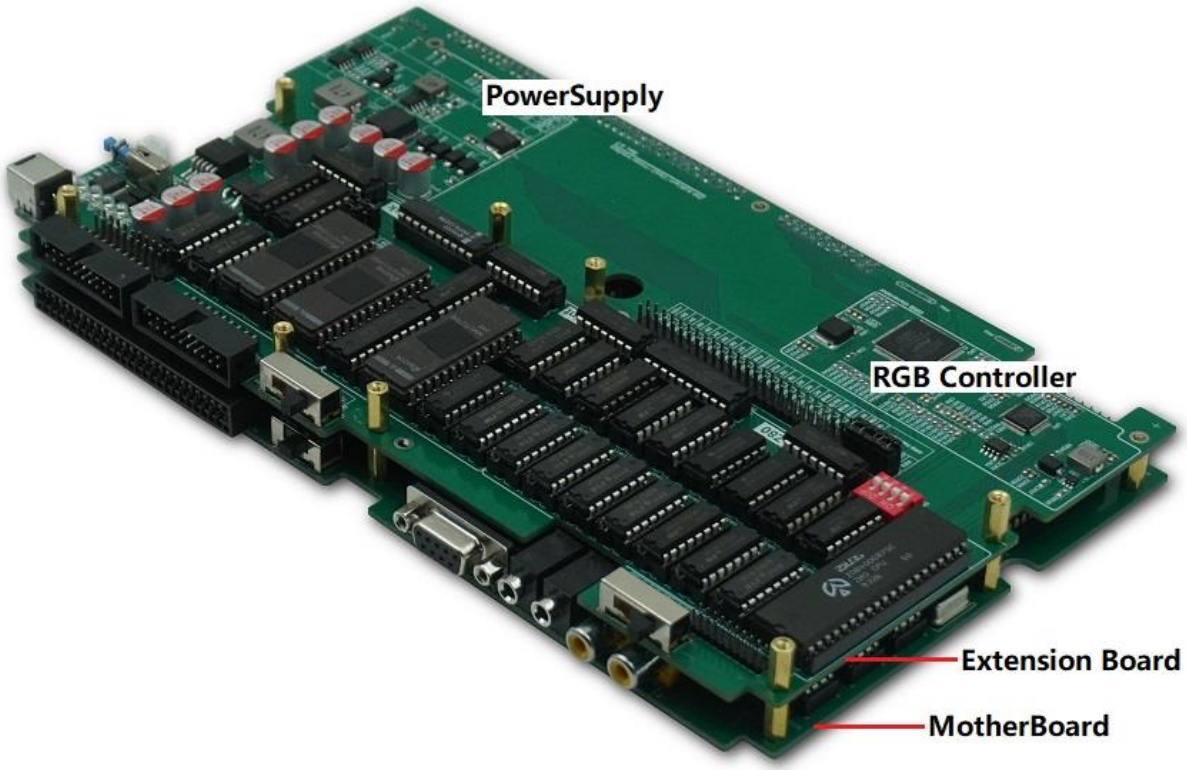
[16]. Power adapter input (12V 3A)



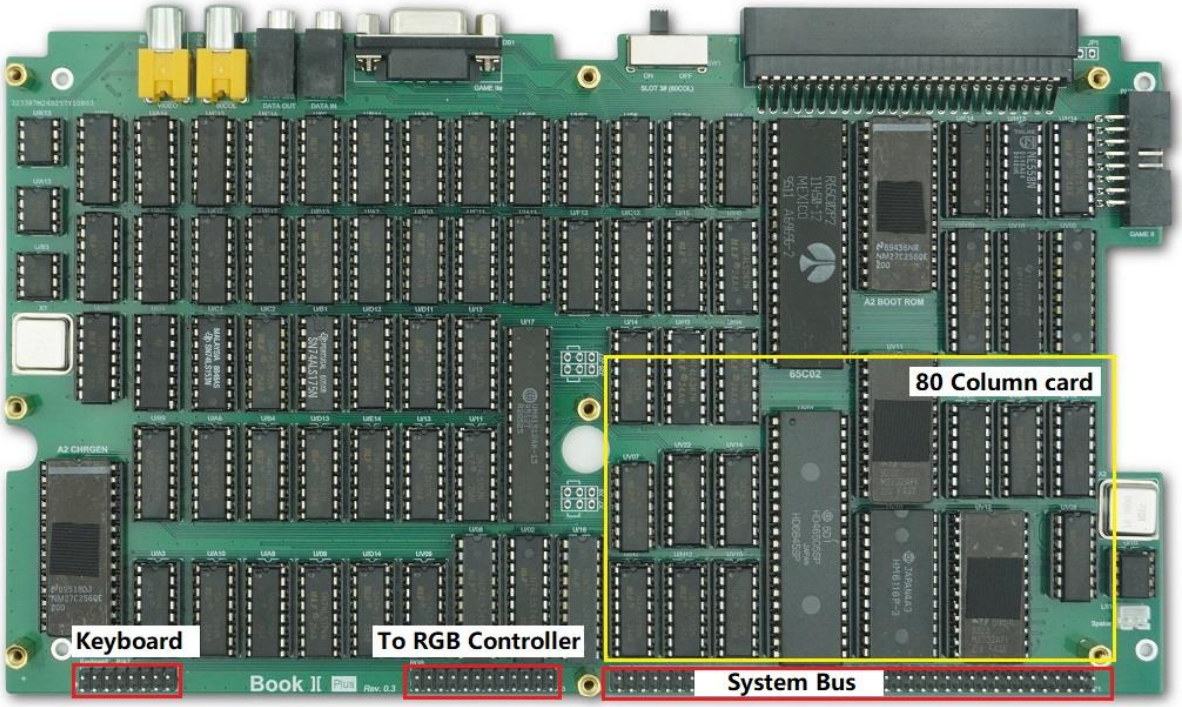
5. Internal Components Introduction

- MotherBoard

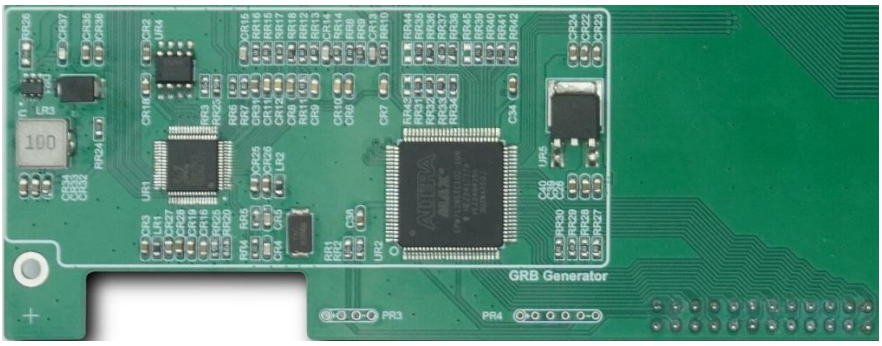
The BOOK II motherboard consists of upper and lower layers connected via the system bus. The lower board includes the Apple II-compatible mainboard and the 80-column video card. The upper board houses the power module, Disk II controller card, printer interface card, and Z80 SoftCard.



(Lower board: Apple II compatible mainboard)

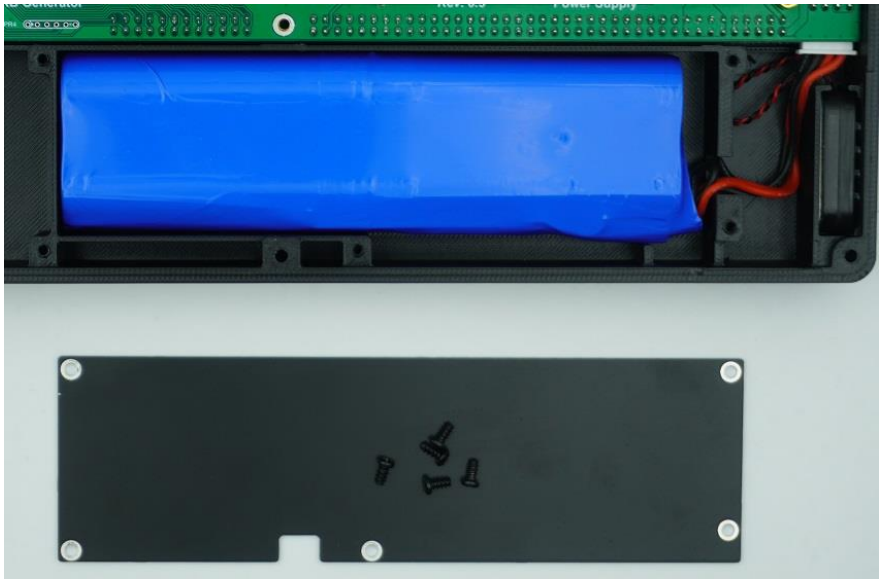


- RGB Controller



The RGB controller converts video data from the mainboard and the 80-column card into an RGB signal. The entire process is implemented using pure digital logic, with no frame buffering or MCU computation involved. The image is not re-sampled, so pixel positions on the LCD correspond exactly to the original television signal. A toggle switch on the rear panel selects whether the LCD displays video from the mainboard or the 80-column card. The conversion logic is implemented as a schematic within a CPLD chip. The remaining logic gates in the CPLD are utilized to provide additional practical features, such as monochrome display and multiple text color options.

- Battery: 4x18650



Appendix

- **BOOK II – A2-JOY Connection Image:**

- Bus Expansion Interface Usage Reference Image