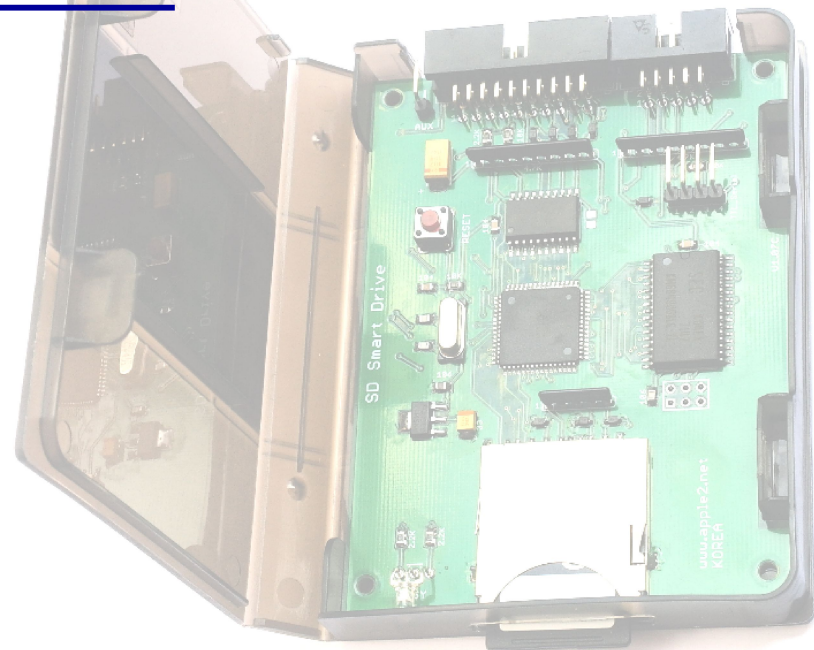




SD Smart Drive user's Manual



Made by Ian Kim Who
love the APPLE][

Introduction

Thank you for purchasing the SD Smart Drive.

My name is Ian Kim and developer of the SD Smart Drive.

I'm glad to introduce SD Smart Drive for APPLE II fans and hope to enjoy it on your APPLE II.

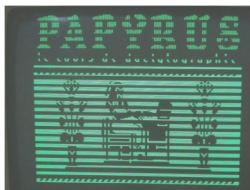
- SD Smart drive is a SD Memory based data storage device for APPLE II .
- It emulates **two 5.25" FDD** and **9 HDD(MAX)** on smart port **at the same time**.
- It isn't dumb device. It accept text commands and it can be controlled by USB serial dongle and/or LCD&Dial controller.
- It has internal 512KB SRAM buffer as much as similar as real FDD.
- I'm trying to apply new feature such as NIB/NIT file support. It is working but have to improve for stable reading.
- I'm keep going to improve this SD Smart Drive. let me know if you have any better idea for all of us :)

Why SD Smart Drive?



FDD

- **It emulates two 5.25" FDD**
 - It is the maximum amounts of 5.25" FDD on one DB19 connector.
 - Only one FDD is painful to play bigger games such as Ultima 4 and 5 etc...
- **Read/Write and partial Format support**
 - R/W and partially Format function supported. Due to this Format capability, You can write DISK with Some of COPY Utility.
 - DISK COPY can do it with Crazy copy V1.0 and NIBBLE AWAY][and some more may work with it(Not all of COPY Utility works).
- **Power On Booting similar as the real FDD**
 - If you assigned DISK image(root and next level of directory only), It will use for next power on Booting.
 - It works with FDD and HDD emulation too but, FDD is higher priority(Slot#6).
- **Half track support**
 - Can R/W on Half track position.
- **Up to 39 tracks R/W support**
 - DOS Standard total track is 35 but, SD Smart Drive can R/W up to **39 tracks**.
 - You can write extra track data.
- **Copy protected image NIT is on going to support**
 - FDD on APPLE II is controlling by S/W and a lots of types copy protected methods are exist and hard to emulate it on virtual DISK emulator. SD Smart Drive is on going to support the NIB/NIT file and having good results. I will try to complete this but, I have not so much sample NIT file have. anyway, If you have NIB and NIT, load NIB on D1 then it will load NIT, then NIT for timing emulation started. in this case, You can't use 2nd drive(D2) cause NIT file is consume the 2nd D2 buffer.

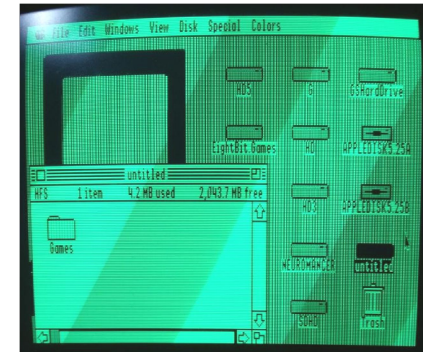


- **It support Max 9 HDDs**

- **Use 2 FDDs and 9 HDDs at the same time**

Just remember Slot# 6 is for FDD and Slot#5 is for smart port device.

So, you can freely use FDD or HDD without consider the mode.



For example, If you want to copy a file from FDD image to HDD image vice versa, You need to change mode each time it is very hard to do it and more on GSOS, you can't use FDD properly. if there is mode exist and change to FDD mode, your HDD will disappear from that time and fail to continue the GSOS. but, SD Smart Drive has no such as problem or difficulties, Just use as you have two FDDs and several HDDs.

Why SD Smart Drive?



Easy dual user interface

LCD&DIAL controller and **USB Serial dongle** can be used to control SD Smart Drive.

Simple way is **LCD&DIAL controller**, complicated way can be done by **USB Serial** on terminal.

I prepared some of commands for you.

Why dial is powerful, because you can select image file very easy and faster, unlike other emulator, you no need to push 100 times to select the 100th image file. just turn your dial around 5 times, then you can find 100th file for loading.

SD Smart Drive can use on APPLE II series (II+ //e with DISK controller, IIc, IIc+, IIGS)

Beginning of APPLE II series, DISK controller could have only 2 FDD, SD Emulator support it.(Controller must support DOS3.3 16 sectors)

If your APPLE II has a DISK Controller with DB19 connector(for Duo Disk), You just connect it with DB19 converter board then have 2 FDD.

Special support for APPLE IIc

1) Support FDD1 or FDD2 power on booting

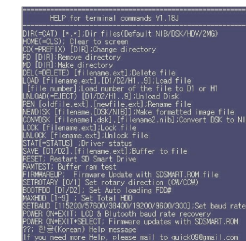
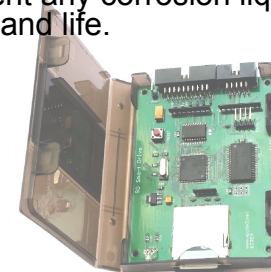
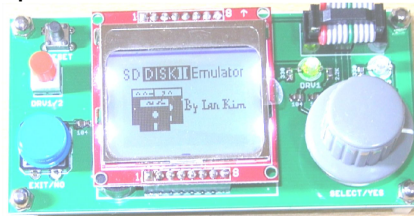
Due to APPLE IIc design, DB19 connected FDD is **2nd** FDD(Drive-B) on APPLE II.

If you connect it with DB19 board the First emulated **D1** is **Drive-B** on APPLE II and if you pull a wire from inside of FDD then the **D2** will be a **Drive-A**. To make power on boot, there is a command prepared to activate D2 for power ON loading for boot. it is only useful for APPLE IIc other case, just will load the file to D2.

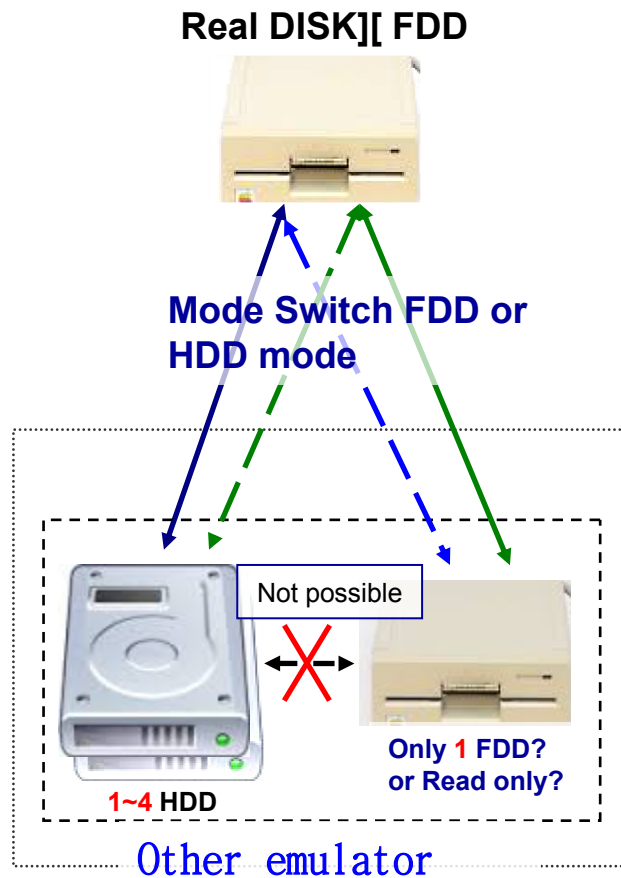
2) APPLE IIc already has one 5.25" FDD inside. if you remove and replace the SD Smart Drive inside and can connect the IDC20 ribbon cable to SD Smart Drive after that **IN USE LED** will work. I prepared it for APPLE IIc. it is very small thing but, SD Smart Drive only can do it for your APPLE IIc.

Solid capacitor used

I used only solid capacitors, not because of life and quality but to prevent any corrosion liquid leak from electrolytic capacitor. Capacitors are important to establish the stability and life.



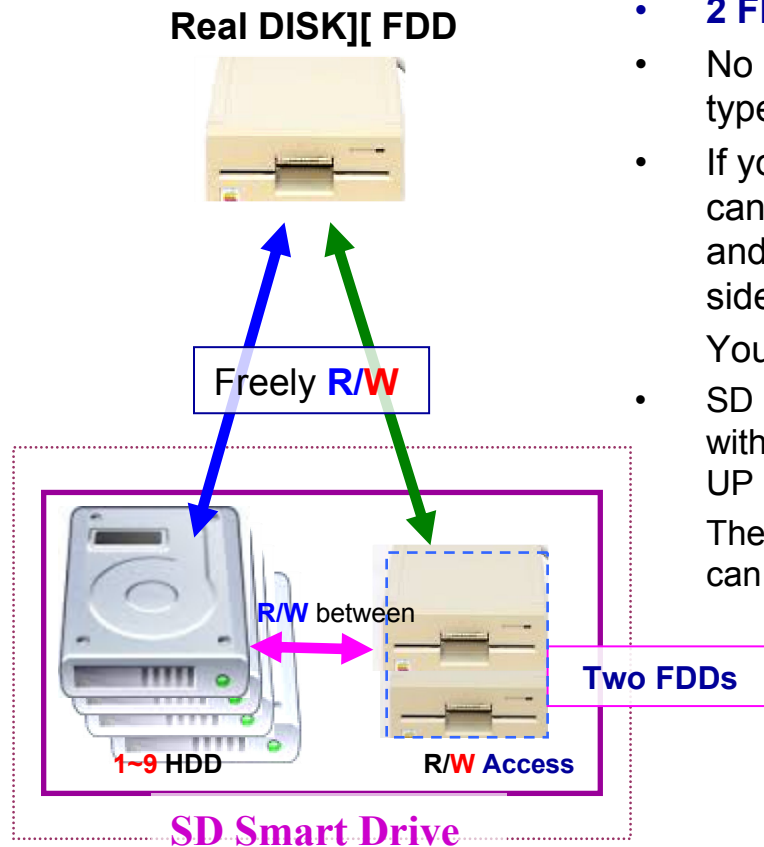
Compare to other emulators



Just check what is advantage of SD Smart Drive

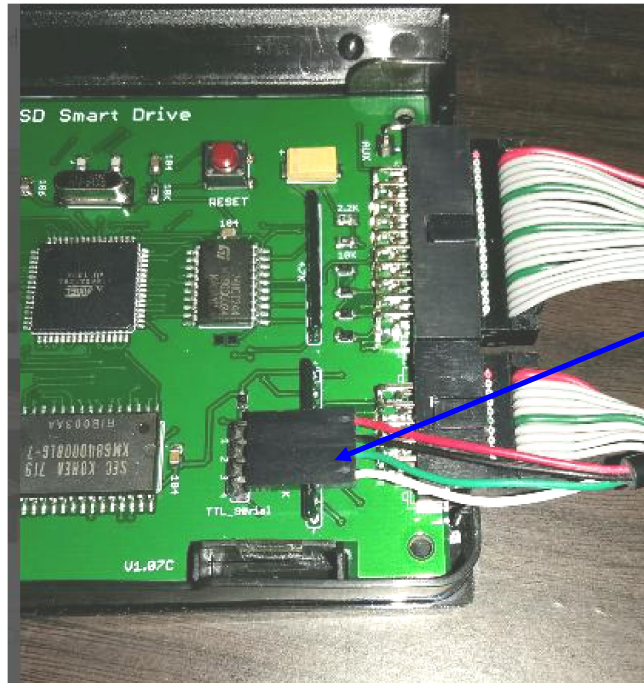
- Except SD Smart Drive, all other APPLE II external DISK emulators are not support FDD and HDD at the same time.
 - 1) HDD or FDD mode changing is one of difficulty and problem while using GSOS. If you change mode to FDD, your HDD will disappear.
 - 2) You will have difficulty to copy a file from FDD image to HDD side, and some copy utility can't run properly. because program have to access HDD or FDD by itself to complete big file. so it results fail to copy the file.
- Some of Emulator only support one FDD. One FDD is inconveniences and have to replace another side often while playing such as Ultima 4 or Ultima 5 etc..
- DISK COPY not supported. If emulator couldn't support DISK COPY, You can't create NIB image file from real DISKETTE(I'm using this way to convert to NIB image file from my old DISKETTES).
- Some FDD emulator is not wirteable, it is a pain andmore some of game required write for travel log and etc So, you can't play bigger nice advantage game with that.
- Some emulator support only 4 HDD But, the SD Smart drive support Maximum number of HDDs by APPLE II.

But SD Smart Drive capability

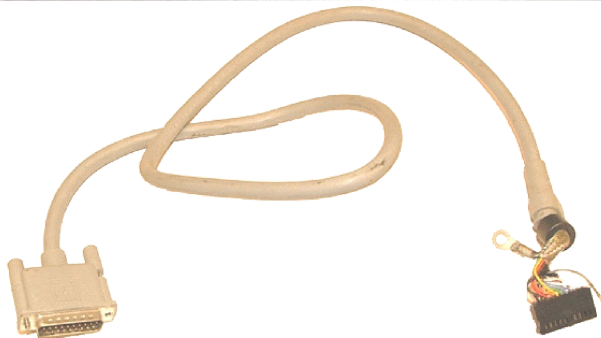


- **2 FDDs** and **9 HDDs** support for your APPLE II.
 - No mode change for HDD and FDD, It supports both type of DISK at the same time.
 - If you have a real FDD (Such as APPLE IIc etc..), you can copy from real DISK to virtual DISK vice versa and more you can copy files from FDD image to HDD side vice versa.
- You can copy between internal emulated FDDs too.
- SD Smart Drive supports DISK COPY. You can DISKCOPY with CRAZY COPY V1.0 and NIBLES AWAY][and BACK IT UP II+ etc. (not tested all)
- The DISK COPY will create copied NIB Image file then you can share it for other users.

Connect cables on SD Smart Drive



1. Please open the case and connect cables as the picture.
2. Serial dongle have to properly connected on TTL_Serial pins, Red line must be up side.
3. Please connect 20 pin flat cable this IDC20 ribbon cable can be replaceable to APPLE II standard DB19 cable of the picture one.
4. Please LCD&Dial controller cable

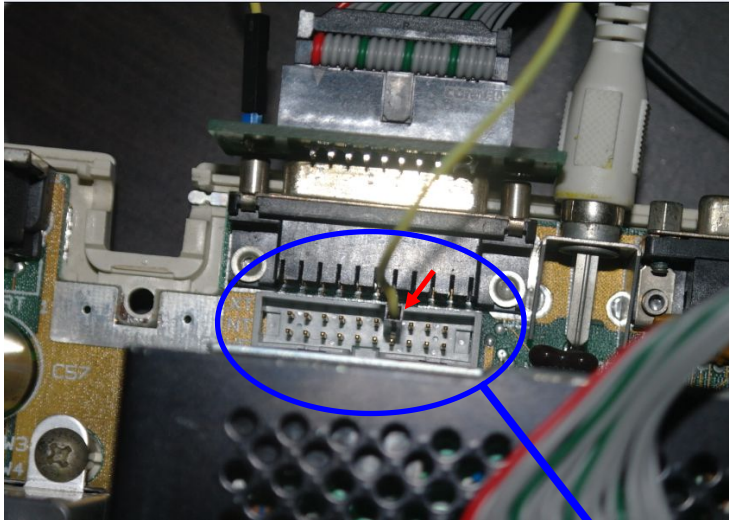


SD Smart Drive for APPLE IIc

SD Smart Drive is working very well on APPLE IIc.

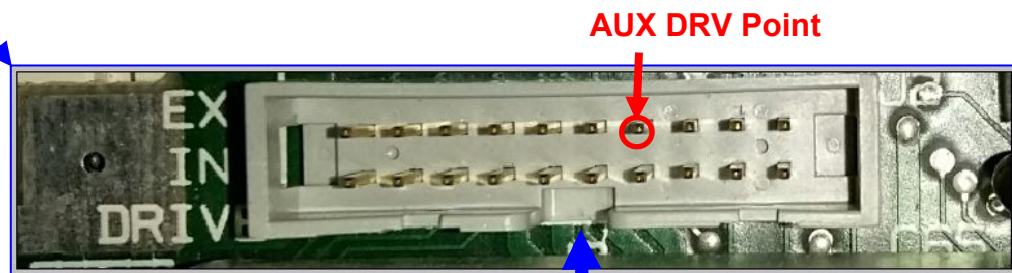
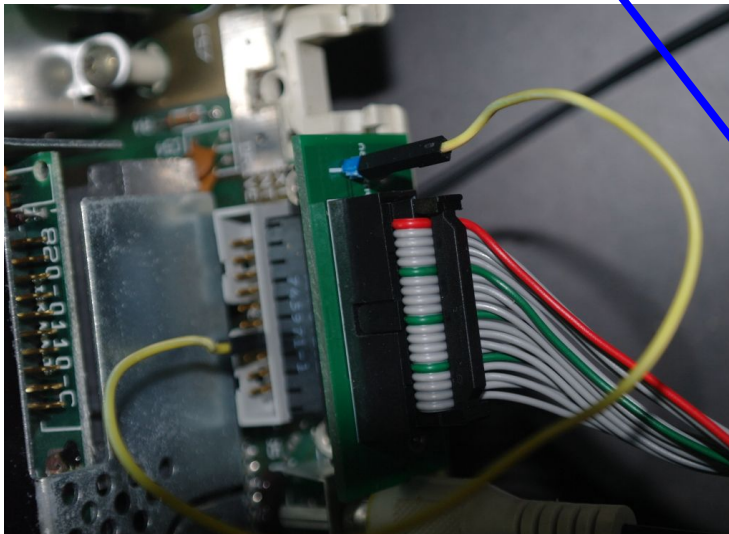
- If you connect it on DB19 connector. you will have additional **1 more FDD** and **9 HDDs**.
- But you have to consider that APPLE IIc have several version of **ROM**.
If your APPLE IIc has **ROM255**, you can't use HDD, Because **ROM255** doesn't support the Smartport.
Hence, I suggest to upgrade your ROM chip at least ROM0 and ROM4 is better. Anyway ROM255 version of APPLE IIc could boot 2nd FDD as 'PR#7'.
- Do you want emulated full 2 FDDs?. One FDD make me bothering. How can I do it?
 - DB19 connection only, it can't have two FDD. cause of you have already 1 FDD(Drive-A) in the APPLE IIc.
 - You have to remove inside FDD and pull a wire from the pin socket.
 - You can find this way on the manual.
- To open the APPLE IIc, Please refer it.
<https://www.ifixit.com/Guide/Apple+IIc+Floppy+Drive+Replacement/6774>
- If you want to install the SD Smart Drive inside of APPLE IIc, you can do it but, you have to pull a line from DB19.
In this case, Internal LED Indicator '**IN USE**' will work on as folloed drive access.
* LED only works when you install inside of APPLE IIc not only connected DB19.

How to use two emulated FDDs on APPLE IIc



To use FDD1 and FDD2 on SD Smart Drive, You need to open your APPLE IIc and then have to connect a pin.

- 1) Remove short IDC20 cable of Drive-A in the APPLE IIc.
- 2) Use a included 1pin connector and connect it one of pin socket as the picture. Position is **upper line** and **4th pin**.



OPENed Notch

How to use two emulated FDDs on **APPLE IIc**



- 3) Arrange 1pin connector.
- 4) Close upper case carefully.
- 5) Connect DB19 pin converter board.

So, SD Smart drive assigned below.

D1 is **Drive-B** on APPLE IIc

D2 will be **Drive-A(bootable drive)** on APPLE IIc

Please remember this. DB19 connected FDD is
1st=D1 on SD Smart Drive, AUX pin FDD is
2nd=D2.

To make power ON auto image loading on D2,
you need to configure it. Please refer
'**BOOTFDD**' command to set it up.

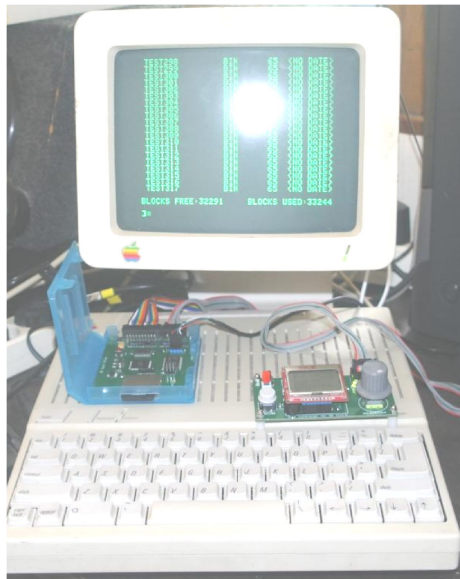
SD Smart Drive on APPLE IIc plus

- You can use it as **two 5.25" FDD** and **7 HDD**. just connect on DB19 socket.
You can't use **1st HDD** on Smartport, Because APPLE IIc already has a 3.5" FDD and occupied the H1 already.

Q] Can I boot from SD Smart Drive even if don't have diskette for 3.5" FDD?

A] You can boot from SD Smart Drive. The 2nd HDD can boot.

Please press '**Control + Option + Reset**' then APPLE IIc plus will restart and start to boot from 2nd HDD(H2) image. Just care boot image for H2 on SD Smart Drive.



Connect DB19 converter board on APPLE IIc,IIc plus



- Please carefully insert DB19 converter board as the picture.
Please avoid any **bend** or missing pin or bias connection.

<Only for **APPLE IIc** >

APPLE IIc has already 5.25" FDD So, **D1** on SD Smart Drive will be 2nd FDD(**Drive-B**).

If you can remove internal FDD then you can use **Drive-A** and **Drive-B** by SD Smart Drive but, you need to connect the **AUX pin** and a position inside of **APPLE IIc**.

Install on APPLE IIGS

SD Smart Drive is ready to use for APPLE IIGS.

- You can use SD Smart Drive as **two 5.25" FDD** and **9 HDDs**.
- Your APPLE IIGS may need to setup for the **Smartport(Slot#5)** and **Disk Drive(Slot#6)** on the control pannel
- 2GB HFS format support(It works under GSOS)
 - SD Smart drive support 2GB HFS format. I put sample in a SD memory card, you can unzip it. then can use it after assign a location on HDD.

☞ Some of cases of while POWER **ON** your APPLE IIGS, It may fails to detect Smartport devices(not FDD, FDDs are always detected and work),

In this case, Please restart your APPLE IIGS once again with '**Control + Apple + Reset**'

(It required only one time after power ON)

Due to Smartport initialize timing issue, unlike APPLE IIc or IIc+, The APPLE IIGS spending some time to initialize smart port. In that time, SD Smart Drive is busy to load FDD image for Power ON booting and may fail to reply the initialize.

To make sure to boot from HDD(Smartport device), you can **unload FDD image** So, SD Smart Drive skip the Loading then always can start from HDD image.

Connect on APPLE IIGS



- Please carefully insert DB19 converter board as the picture. Please avoid any **bend** or missing pin or bias connection.
- AUX pin is not used for APPLE IIGS

Install on APPLE][,+,//e



APPLE II Plus and //e with DISK][or DuoDisk controller

- SD Smart Drive support and two FDD on APPLE][.
- APPLE II+ and //e general DISK controller couldn't support the Smart port hence can't use Smartport HDD.
- Due to SD Smart Drive have only one IDC20 socket so you can use one FDD but, if you want two FDDs

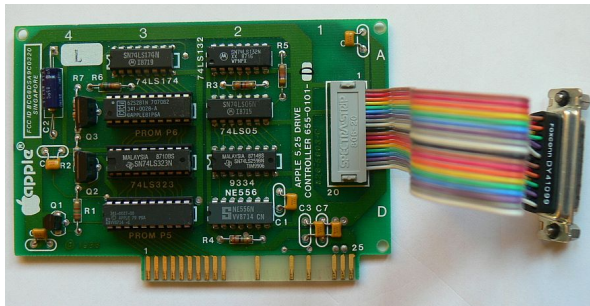
There are two ways.

1) Use AUX Pin to activate 2nd FDD

- If you OPEN the SD Smart Drive, there is a PIN written as AUX. it is for additional FDD.
- You need to connected this pin to active another FDD.
- Provided pin cable is short for it(cause it for APPLE IIc) hence, you need to extend this wire to connect on another side FDD pin.
- In fact, the connecting point of DISK controller is the same as IIc connection location.
- Refer the following page for this.

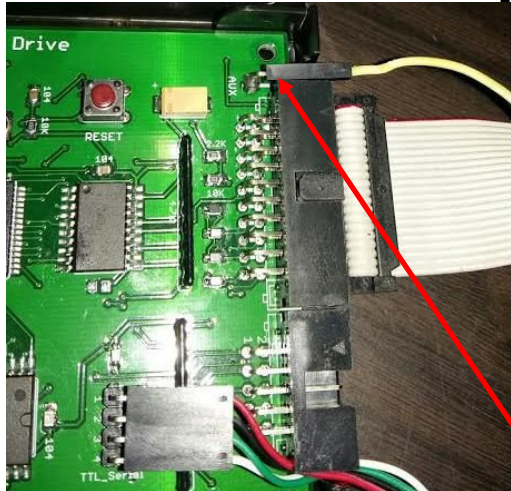
2) Using on Duo Disk controller (it has a DB19 connector)

- It will be easy for you. Just connect as APPLE IIC/IIGS cases. then you can have two FDDs. No need to connect AUX pin.



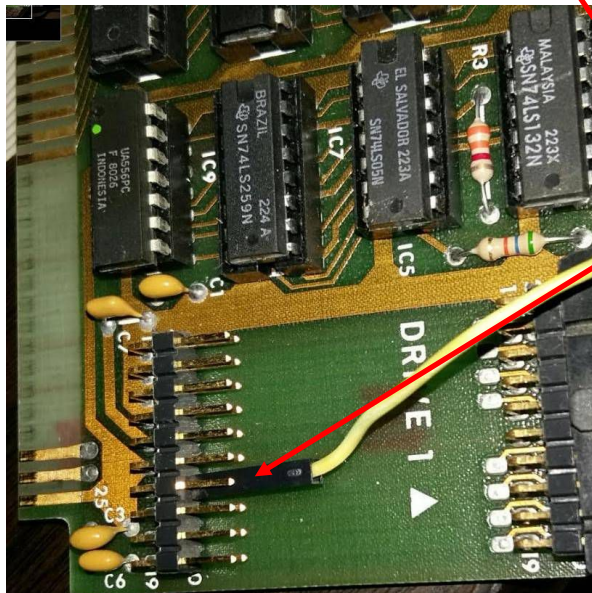
**** If you have the Liron card or Super disk controller,**
please test with SD Smart Drive and let me know the results.
I want to make it run with the nice card.

Connect for 2nd FDD on DISK] controller



Your DISK controller should support DOS3.3
16sectors one not 13sectors .
(If you can boot DOS3.3 it means you have
16sector FDD controller)

Please refer the picture for 2nd FDD on
DISK] controller card.



1pin cable is short, you need to extend it.
Look at the below picture,
The pin connection point pin is **Under line 4th
pin from bottom side.**

Connect LCD&Dial board and prepare for you



☞ To control by terminal, you need to connect provided a USB dongle to PC and set the [Teraterm](#) terminal program serial configuration is below.

Baud rate(speed); 115200bps
Stop bit: 1
Data bits; 8
Parity; None
No flow control

You are almost ready to **ON** your APPLE II

- Check again if your cable are connected properly.
- Then turn on your APPLE II.
- If you need configuration on your **APPLE IIGS** for Disk port and smart port, please configure it.
(**Control + Option + Reset also** can go into the control panel)
 - Select Smart Port on Slot#5 for HDD.
 - Select Disk port on Slot#6 for FDD.
- You can see the SD Smart Drive is working(Red LED ON).
- If you want, you can stop your APPLE II with Ctrl+Reset then you can select image file for FDD/HDD.
- If Drive is busy(Red LED ON), It wouldn't accept text and dial command.

User interface of SD Smart Drive

- 1) USB Serial dongle
 - If you connect the included USB Serial dongle on PC, It will install driver and can connect as Serial connection(Com#n) then you can use an terminal S/W. I recommended to use the Teraterm(<http://ttssh2.osdn.jp/>).
 - SD Smart Drive have several commands to configure for user conveniences.
- 2) LCD&Dial controller
 - Connect on SD Smart Drive.
 - It is one of easy way to control SD Smart Drive.
 - You can select image file with combination of buttons and turning the dial. It has small LCD and small speaker it generate sound while accessing the disk.

Major text commands

- All Commands are not case sensitive. You can key-in with lowercase.
- **?**; Display help message for commands.
- **DIR** ; Similar as DOS DIR. will show files.
- **LOAD**;
 - Load your image file into FDD or assign for HDD
 - Load {image file.ext},D1 or D2
 - Load {image file.ext},H1..H9
- **CD**; change directory
 - CD {Name of directory}
- With those commands you can start to use SD Smart Drive.

'?+enter' English help message

```
=====
HELP for terminal commands V1.18G
=====
DIR(=CAT) [*.*];Dir files(Default NIB/DSK/HDV/2MG)
HOME(=CLS); Clear to screen
CD(=PREFIX) [DIR];Change directory
RD [DIR];Remove directory
MD [DIR];Make directory
DEL(=DELETE) [filename.ext];Delete file
LOAD [filename.ext],[D1/D2/H1..9];Load file
[file number];Load number of the file to D1 or H1
UNLOAD(=EJECT) [A1/D1/D2/H1~9];Unload Disk
REN [oldfile.ext],[newfile.ext];Rename file
NEWDISK [filename.[DSK/NIB]];Make formatted image file
CONVDSK [filename1.dsk],[filename2.nib];Convert DSK to NIB
LOCK [filename.ext];Lock file
UNLOCK [filename.ext];Unlock file
STAT[=STATUS] ;Driver status
SAVE [D1/D2],[filename.ext];Buffer to file
RESET; Restart SD Smart Drive
RAMTEST; Buffer ram test
FIRMWAREUP; Firmware Update with SDBIOS.ROM file
SETROTARY [0/1] Set rotary direction (CW/CCW)
BOOTFDD [D1/D2]; Set Auto loading FDD#
MAXHDD [1~9] ; Set Total HDD
SETBAUD [115200/57600/38400/19200/9600/300]; Set serial baud rate
POWER ON+EXIT; LCD & Bluetooth baud rate recovery
POWER ON+EXIT+SELECT; Firmware updates with SDBIOS.ROM
??; 한글(Korean) Help message
If you need more Help, please mail to quick09@gmail.com
=====
```

You can see text commands.
Some commands are same as
APPLE II DOS commands.

Command may be added or
omitted. Please check the note
when new version announced.

If you want new commans with
specific function, please let me
know.

Load image file

'DIR' +Enter then you can see files.

Now, You can load a image file into the Smart Drive then I will start to emulate as FDD or HDD.

- LOAD

Example)

- Load FDDTST.NIB,D1 ; it means the load 'FDDTST.NIB' into D1(1st FDD Drive)
- Load HDD.HDV,H1 ; it means that set 'HDD.HDV' file for HDD1. HDD emulation.

It doesn't load the image. It just will set for use.

Loading image file

☞ After you select a image file for HDD, you should not go to another directory. SD Drive will use when HDD access. SD Smart Drive is looking for the set file on current directory so, If you move to another directory, HDD will fail to access.

It isn't same result of FDD emulation

FDD emulation is working cause DISK data already in the buffer but, Problem only happed when it need to update (After DISK write operation).

SD Drive will looking for the file on current directory to update with new written data But, can't find on current directory and fail to update the image.

- If you want to use HDD and FDD same time. It's easy to put all your files into one directory.
- But, you can use it without error if you care properly. Just remember one principle.
 - **FDD image loading** is reading the image file and put into the Buffer. If write operation happend, SD Smart Drive try to update the file on current directory. if file doesn't exist, It make a temporary file and write there.(track data).
 - **HDD operation** is on current directory. Before to access HDD, Your current directory should be on the HDD image file not other location.
If you can't expect when HDD operation, you should back to soon over the HDD image location.

CD(change directory)

`CD{directory name}`; When you CD command you also can see file list

Go upper directory type '`CD..`' or `Exit button` on Dial.

Much easier way to use test command

```
dir
-----
Volume ID SD_SMART
01 #
02 15-07-28 <DIR> #APPS
03 14-10-17 <DIR> #CPM
04 15-06-30 <DIR> #DSK
05 15-03-16 <DIR> #GAME1
06 14-10-17 <DIR> #GAME2
07 15-07-28 <DIR> #GAME3
08 15-06-30 <DIR> #GRAPHICS
09 14-10-17 <DIR> #HDD
10 15-01-20 <DIR> #MUSIC
11 14-12-11 <DIR> #NEWGAME
12 15-04-25 <DIR> #SD_MAN~1
13 15-05-11 <DIR> #SD_MUSIC
14 14-06-03 <DIR> #ULTIMA~1
15 15-03-16 <DIR> #ULTIMA~2
16 14-02-13 232960 LOADRUNN.NIB
17 14-02-13 232960 PRODOSLIT.NIB
18 15-04-06 232960 SDMUSIC.NIB
19 14-02-13 232960 SPYSPY.NIB
20 14-02-13 232960 TETRIS.NIB
21 14-04-12 259584 CPS.NIB
22 14-04-22 232960 DISK.NIB
23 14-02-19 232960 DOS33MST.NIB
24 13-08-17 232960 DOS33SP.NIB
25 14-11-19 259584 FDDTST.NIB
26 15-07-24 33554432 GSOS602.HDV
27 13-09-05 33553920 HDD(1).HDV
28 13-09-05 33553920 HDD(2).HDV
29 14-06-05 33553920 HDD.HDV
30 14-02-13 819200 NEUROM~1.HDV
31 14-05-02 33553920 SD2HDD.HDV
32 14-11-21 33553920 SYSTEM6.HDV
33 14-10-13 33553920 GAMES.HDV
34 14-10-26 33554496 GSGAMES.2MG
-----DRIVE STATUS-----
D1: FDDTST.NIB
D2:
H1: SD2HDD.HDV
H2:
H3:
H4:
```

- It is annoy to key in again as using old DOS computer. so, I prepared simple way to use SD Smart Drive.
- **Just use number**
- if you key-in 'DIR', you can see some number on the left side.
- Just key in the number +Enter for specified function.
If directory, it will go into the directory and show files.
If it was a file for FDD, it would load into FDD1.
If it was a file for HDD, it would assign into HDD1.
Better than full commands isn't it? but, it loads only for Drive1(D1 or H1). If you want for D2 or H2... you have to key in with full commands. This number command designed for easy to run the image on your APPLE II.

Change Directory by number

```
3
DIR
-----
01  ..
02  13-08-28 232960 CPAM51A.NIB
03  13-08-28 232960 CPAM51B.NIB
04  14-02-19 232960 CPM.NIB
05  11-09-03 232960 CPM60K.NIB
06  13-09-18 232960 CPMCAL~1.NIB
07  13-09-18 232960 CPM_DB~1.NIB
08  14-02-19 232960 TPAS301A.NIB
-----DRIVE STATUS-----
D1: ?FDDTST.NIB
D2:
H1: ?SD2HDD.HDV
H2:
H3:
H4:
-----
2
LOAD CPAM51A.NIB
D1: CPAM51A.NIB Ready
```

- Key-in '3', then will show \CPM directory.
- Then if you key in '2' the file will be loaded into D1.
- Simple but powerful.

Need some configuration

Most of cases, SD Smart Drive working fine with factory defaults.

But, I can't make it best fix on your APPLE II. Each model of APPLE II havings little different characteristic. So you may need some setup for your system.

Please refer this manual and adjust some factor for your system.

Configuration commands

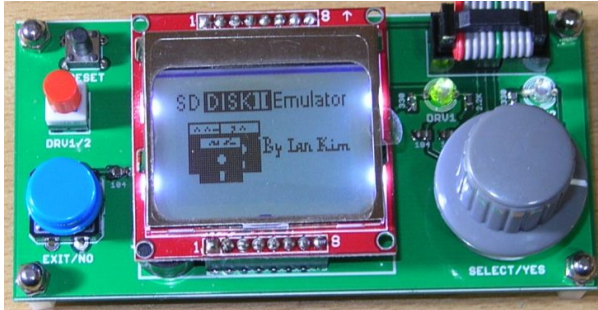
- **MAXHDD {1~9}**, Default is 4, You can increase up to 9.
- **SETBAUD {bps}**, You can change serial speed. (Always Higher speed is recommended)
- **BOOTFDD {1/2}; default is 1**, You can assign 2nd FDD for Power on boot file loading. this is needed if you install SD Smart Drive into the **APPLE IIc**. other system just will load image file for 2nd FDD.
- **SETROTARY {1/0}**, You can change your dial direction to CCW or Cw. use it for your conveniences.

Other commands

```
=====
HELP for terminal commands V1.18J
=====
DIR(=CAT) [*.*];Dir files(Default NIB/DSK/HDV/2MG)
HOME(=CLS); Clear to screen
CD(=PREFIX) [DIR];Change directory
RD [DIR];Remove directory
MD [DIR];Make directory
DEL(=DELETE) [filename.ext];Delete file
LOAD [filename.ext],[D1/D2/H1..9];Load file
[file number];Load number of the file to D1 or H1
UNLOAD(=EJECT) [D1/D2/H1..9];Unload Disk
REN [oldfile.ext],[newfile.ext];Rename file
NEWDISK [filename.[DSK/NIB]];Make formatted image file
CONVDSK [filename1.dsk],[filename2.nib];Convert DSK to NIB
LOCK [filename.ext];Lock file
UNLOCK [filename.ext];Unlock file
STAT[=STATUS] ;Driver status
SAVE [D1/D2],[filename.ext];Buffer to file
RESET; Restart SD Smart Drive
RAMTEST; Buffer ram test
FIRMWAREUP; Firmware Update with SDSMART.ROM file
SETROTARY [0/1] Set rotary direction (CW/CCW)
BOOTFDD [D1/D2]; Set Auto loading FDD#
MAXHDD [1~9] ; Set Total HDD
SETBAUD [115200/57600/38400/19200/9600/300];Set baud rate
POWER ON+EXIT; LCD & Bluetooth baud rate recovery
POWER ON+EXIT+SELECT; Firmware updates with SDSMART.ROM
??; 한글(Korean) Help message
If you need more Help, please mail to quick09@gmail.com
=====
```

- HOME; Clear to screen
- RD; Remove directory. must have no file in there.
- MD; make directory
- DEL; Delete file
- REN; Rename file
- LOCK; Set Read Only Image(no update)
- Should not Lock on HDD(=Smartport) image.
- UNLOCK; unlock the file
- NEWDISK; Create empty DOS3.3 DISK. you can make NIB type of DSK as followed file name.
- CONVDSK; Convert DSK file to NIB.
- STAT; Status of SD Smart Drive
- RESET; Same as power ON status.
- FIRMWAREWEUP; Firmware update by SDSmart.ROM
- SETROTARY; Change directory of rotary
- POWER ON + EXIT; Recover serial connection of the LCD&Dial controller.
- POWER ON + EXIT + SELECT; Update firmware by SDSmart.ROM, it is same as [firmwareup command](#)
- SAVE; Save FDD buffer to file.
- RAMTEST; Test buffer RAM. if SD Smart Drive acts strange, you need to test RAM.

Use with LCD&Dial controller

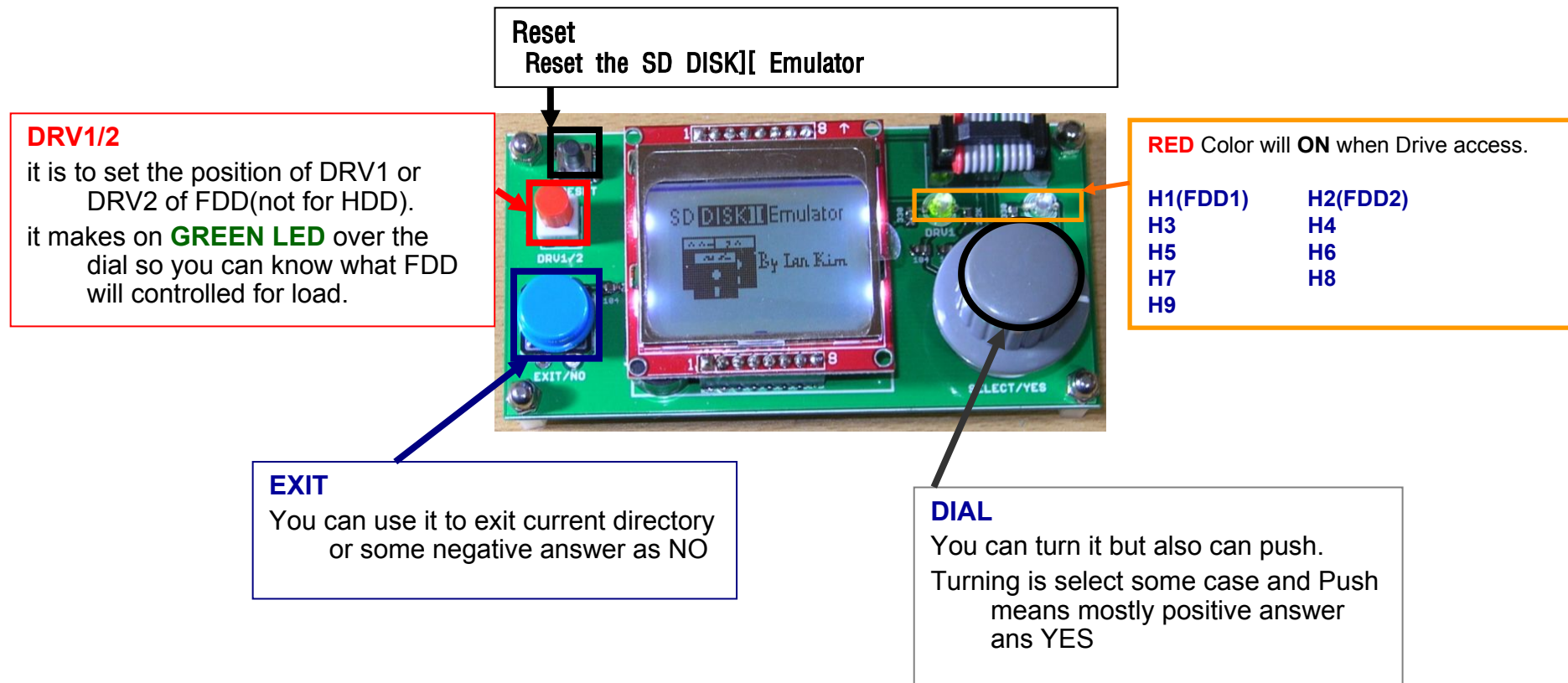


This LCD&Dial controller giving easy control of SD Smart Drive.

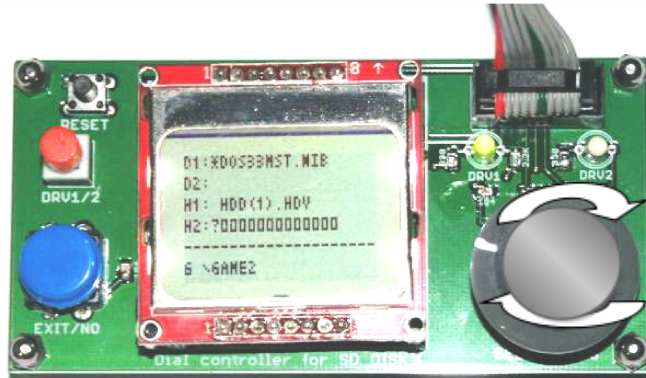
- You use it to select file and navigate directory and some more.
- There are buttons name as 'RESET', 'DRV1/2', 'EXIT/NO' and 'SELECT/YES'. Those buttons are assign similar function as the name.
- **Reset button** make Reset the SD Smart Drive.
- **EXIT/No** is mostly negative approval.
- **SELECT/YES** is mostly positive approval.
- **DRV1/2** is using to select current operation drive of **FDD**(Not HDD), You can know where is the FDD position now.it is using to detect drive# to load image file.(D1 or D2)
- It has a small speaker and make sound while DISK accessing.
- LCD can display (21col x 6 row)
- It has a backlight control. Light will off when it just standby for several minues.

This LCD&Dial controller is compatible to SD DISK][Emulator one.

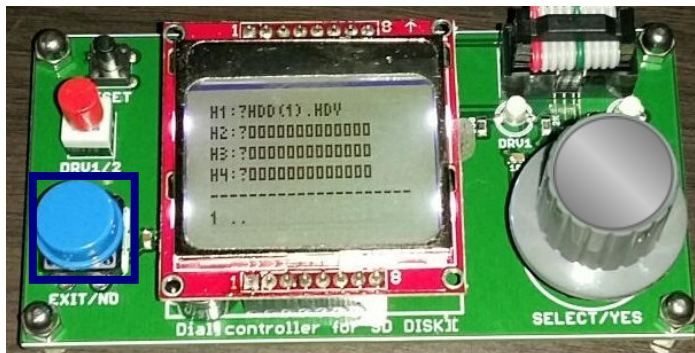
Buttons and LEDs on LCD&Dial



Change directory and LED indication



If turn the dial, you can see image file or another directory on the LCD screen, To select the directory, press Dial over the directory name.



To exit current directory
Press **Dial** on '1..' location or
press '**EXIT**' button. every exit, will go upper
directory to head the root directory.

Major functions of Dial

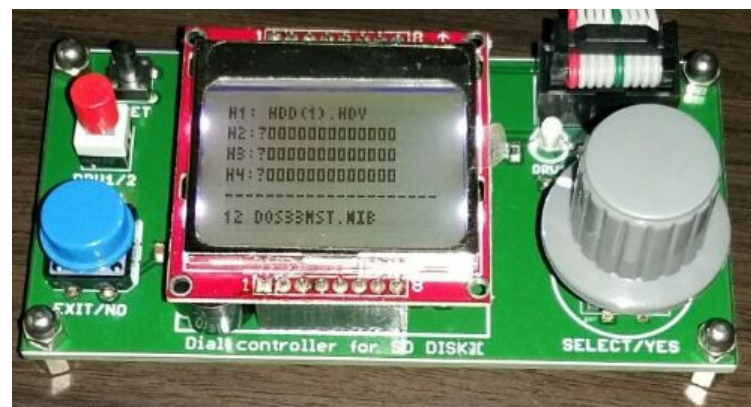
You can turn the SELECT/YES dial to CW, CCW.

You can select image file for loading or can go into another directory.

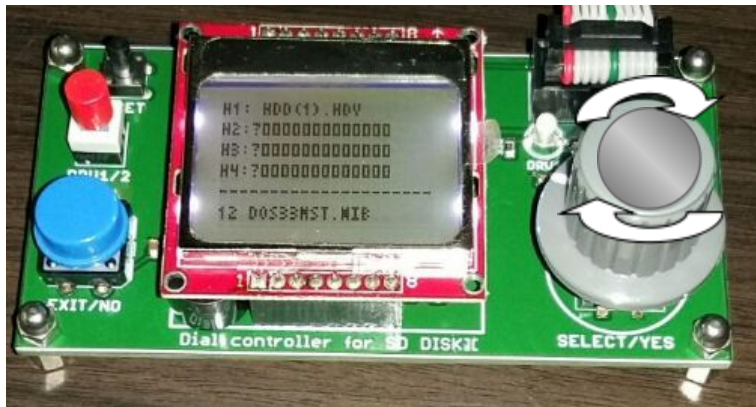
This LCD&Dial is compatible with SD DISK[[Emulator's with improved.

What you can do with this LCD&Dial controller

- 1. Select a image file
- 2. Change current directory
- 3. Set DRV1/DRV2 for FDD
- 4. Reset the SD Smart Drive
- 5. Unload current loaded image of FDD
- 6. Create blank FDD image
- 7. Firmware Update
- 8. Recovery of Serial connection



Select image file and change directory



👉 If you can't see any file or directory, Try to push the **EXIT** button, it will update internally the list of file.

If turn the dial, you can see present directory or image files on the LCD screen and terminal screen(if connected).
To select the file for loading just push button. SD Emulator will load a file or go into the directory.

***Tip;** if selected a file on root directory(1st level) and next directory(2nd level), It will be a next power on booting disk.

Drive status on LCD and terminal

You can see those drive status very often.

It shows the status of image file name for drive.

D1: D2: are emulated FDD

H1... H4 are Smartport device such as HDD. (You can see some after set MAXHDD)

```
D1:XDOS33MST.NIB
D2:
H1:HDD(1).HDV
H2:????????????????
-----
6 \NAME2
```

```
H1:??HDD(1).HDV
H2:????????????????
H3:????????????????
H4:????????????????
-----
1 ..
```

On this example,

DOS33MST.NIB file is loaded on D1

D2 doesn't have image file

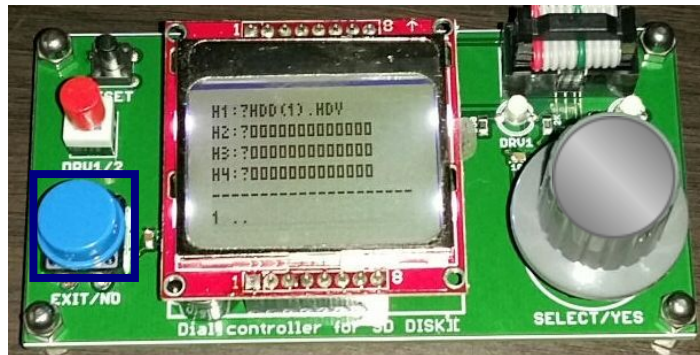
and the '?' means, the image file is write protected. The image couldn't be updated(But, you can write on FDD. it just work as virtual write)

H1: HDD(1).HDV, the HDD(1).HDV file is pointed to use for H1 smart port device.

H2:?? are not defined or the file doesn't exist.

If you see a file name with '?' prefix, it means the file can't find on current directory.

Make blank image file for DOS3.3



Some case, user need to have new image file to save personal file or make another copy image from COPY utility.

In this case, you can create Blank image disk.

To make blank image

- 1) Push Dial (OK) then
- 2) Push EXIT button simultaneously.
(Pushing order is important)
- 3) Select(Turn)new name of disk image.

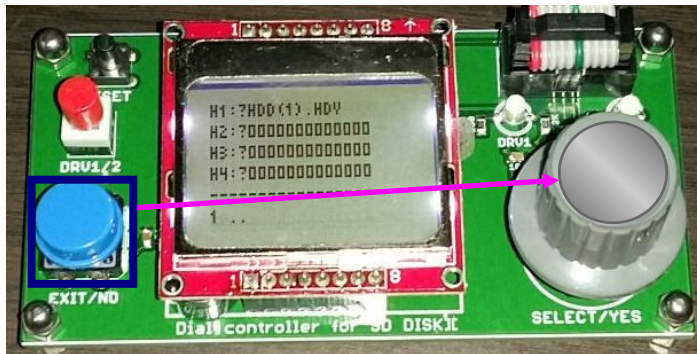
New DISK#
NEWDSK22.NIB

(TO cancel it, Press 'EXIT')

- 4) Press Dial to accept.

It will make DOS3.3 formatted blank disk. so, you can user after load it without format. but, it doesn't contained DOS so, can't use for booting. To make it boot, you can easily copy DOS on COPY][PLUS utility.

Unload image from FDD



Most of cases unloading image is not needed but, If you want to sure, your drive doesn't have any DISK then you can eject current DISK on the Drive.

To perform it.

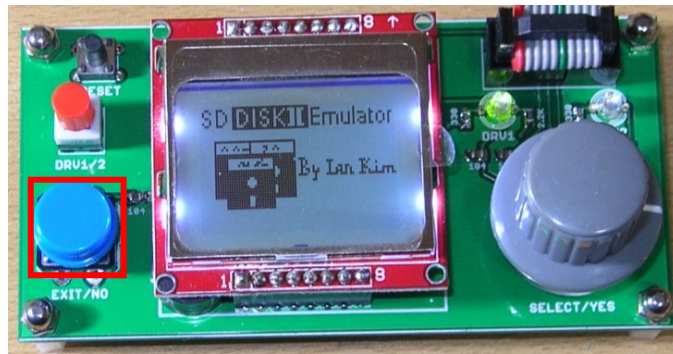
- 1) Press EXIT button first and keep press it
- 2) Push SELECT/YES then

It will unload current image as followed DRV1/2 S/W position.

It works only FDD not HDD.

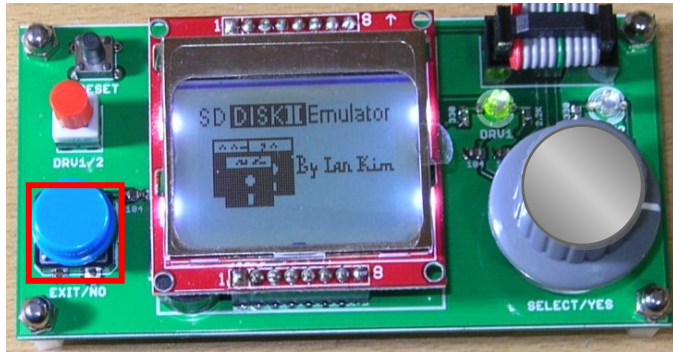
```
Unloaded D1
Unloaded D2
```

Serial connection recovery



- Some of cases, Serial baud rates may have problem. You may see only [] [] such as this.. in this case, You have to recover it as under.
- Power OFF you APPLE II and Press **EXIT** button while the **Power ON** APPLE II then It will start to recovery serial connection. you can see proper text if recovered.
- If it isn't effective for proer LCD display, please contact me.

Firmware update



SD Smart Drive can be updated with proper firmware file.
When I added new function or need to patch, I will announce newer firmware version on <http://www.apple2.net>
please check the web of the SD Smart drive category.

If you don't have inconveniences on current version, you can skip some of versions
However, updating firmware job should do carefully.
Read the warning before to perform it.

WARNING

Your APPLE2 must not lose **electric power** while firmware updating.
If this were happen, the firmware couldn't completed and may fail to to restart even firmware updating may fail.
In this case, You need to send it back to me for re-building codes.
(Free of charge to fix this issue but, shipping costs will be your responsibility).

If you are ready to update, please read it first and follow this instruction.

- 1) Power **OFF** the APPLE2 and open the cover.
- 2) Remove the SD Memory card (Present working SD Memory card should work fine)
- 3) Copy the new firmware file(**SDSmart.ROM**) to root directory in SD Memory card.
- 4) Return the SD memory card to SD Smart Drive.
- 5) Push **Dial button(SELECT/YES) +EXIT button** simultaneously, then power **ON** the APPLE2 now.
- 6) Then release a few seconds later. You may see on LCD as 'system check.....'
- 6) A while later, SD Smart Drive will restart
- 7) Reboot your APPLE2 and check if the version is properly updated.
- 8) Done. Now, Enjoy with new features.

Chart of SD Smart Drive for APPLE II series

System	FDD	HDD	Supported Emulation
APPLE II	1+1	NA	Required pull a line for 2nd FDD. No Smartport HDD.
APPLE II+	1+1	NA	Required pull a line for 2nd FDD. No Smartport HDD.
APPLE //e	1+1	NA	Required pull a line for 2nd FDD. No Smartport HDD.
+ DuoDISK controller(DB19)	2	NA	2 FDDs support with DB19 connector but, No Smartport HDD.
APPLE IIc	1+1	9	Required pull a line for 2nd FDD and MAX 9 smartport HDD.
APPLE IIc plus	2	7	Two 2 5.25" FDD supported. 1st Smartport already occupied by internal 3.5" FDD, hence from 2nd HDD can use.
APPLE IIGS	2	9	Tow 5.25" FDD supported and 9 HDD(GSOS) and 2GB HFS(GSOS) format supported.

※ All FDD are R/W even partialy format works, if you want DISKCOPY, Please use CRAZY COPY V1.0 and NIBBLE AWAY][tested) and some other S/W also may work not all of COPY utility works for DISKCOPY.

◆ I don't have any Liron card and couldn't test it with SD Smart Drive,
If anyone have it, Please try to test it and let me know the results,
I want to make it run on Liron card for APPLE][+ or //e users.

Other information

- Use NIB file for FDD emulation if you want to writeen/updated image.
 - DSK file only work virtual write, (Write function is working but not updated to **DSK** file). Someday I will make it possible.
- 800K image file
 - SD Smart Drive support *.2MG and 800K file.
 - If no header exist, the 800K file can renamed to HDV and it may work under smartport.
- 2MG image files
 - It works but little slower than HDV image. Most of cases, you can remove 64bytes header data and can renamed it to HDV then will work faster than 2MG format.
 - You can't use 5.25" FDD image to this format. SD Emulator handling *.2MG file for smartport purpose. Hence, You also can't assign any of *.2MG image file to FDD location (**D1 nor D2**)
- Laser128
 - SD Smart Drive not support the Laser128. Please don't try on Laser128.
 - I tested it on Laser128 and Bus conflict with internal FDD1. So, if you don't remove internal FDD, Laser128 or SD Smart Drive's enable signal may damage. Please avoid to use it on Laser 128.
 - If you really want to use it on Laser128 there is a way but, 2 FDD only possible not smartport HDD. in this case, please contact me. I will guid for you.
 - I'm still researching to support the Smartport for Laser128.

※ You can also refer the manual of the DISK]] Emulator, Some functions are very similar to **SD DISK]] Emulator**.

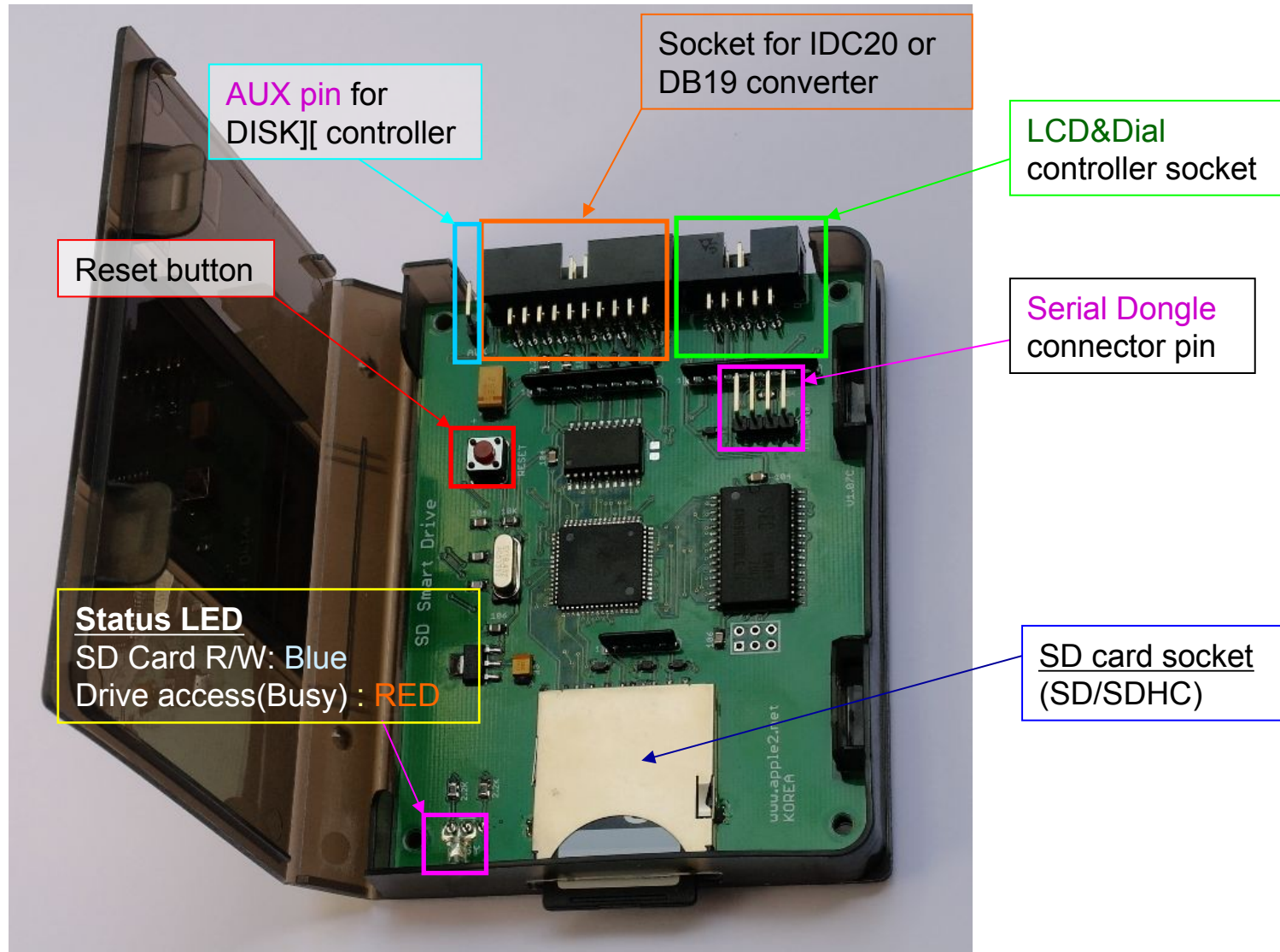
BASIC PRODOS Commands

- CATALOG or CAT(PRODOS); Show Directory and files.
- LOAD {file name}; Load BASIC program.
- BLOAD {file name}; Load Binary file
- PREFIX {Directory} ; Change directory
- RUN {file name}; Run BASIC program file
- BRUN {file name}; Run Binary file
- PR#6; Boot from slot #6 (DRIVE-A only), Mostly 5.25" FDD connected on this slot.
- PR#5
 - Boot from slot #5, If Smart port device connected, It will start boot from the 1st device
 - For APPLE IIc plus, load HDD image file for boot to H2(not H1) then
Press '**Control + option + reset**' . APPLE IIc will restart and boot from H2 image file.

Error message

- **ERR:Can't read**
 - If can't find or can't read file for Smartport emulation.
 - Please don't move to another directory if you using HDD image file.
 - Emulator is using current directory HDD image file.
 - If you used a AUX pin for 2nd FDD, Please check the AUX pin position if it is connected the proper locaion on APPLE IIc.
- **SD Card ERR**
 - SD Memory got error.
 - Please try to format(FAT16/FAT32) the SD meory card or replace to another good one.
- **ERR:No file**
 - If have no file, you may see this error.
- **ERR#nn**
 - If you could see this ERROR while using HDD(smart port), It has a error on the file or memory card, please press 'reset' on dial to restart the Emulation, If insist this error, Please use another SD card.
- **Red LED blinking**
 - Failed SD Card detect. You have to replace to another SD Card and/or try to Format(FAT16/FAT32) the memory card.

Inside of SD Smart Drive



WARRANTY

Warranty periods are 3 months(shipping costs is not covered).
If failed within the period, I will repair or replace it.
Out of warranty case it will be charged the actual repair costs.
If you need any help please contact me.

Quick09@gmail.com

- Anything of hardware change, disassemble, Reverse engineering, Crack, It would expire any warranty.
- Any of documents or comments may different with actual SD Smart Drive version.
- Hardware components may change for better performance or functions without notice.

Do you have any question,request or Idea?

Please send email to quick09@gmail.com
or visit my website <http://www.apple2.net>
and write comments.

I like to read user's feedback :)

Thank you very much.

Ian Kim



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