

# USB Disketten Emulator

## User Guide



ipcas GmbH  
Gundstraße 15  
D-91056 Erlangen  
Telefon: +49 (0)9131/ 7677-0  
Telefax: +49 (0)9131/ 7677-78  
Internet: <http://www.ipcas.de>  
E-Mail: [info@ipcas.de](mailto:info@ipcas.de)

# Contens

# Page

- 1. INTRODUCTION ..... 3
  - Legal Information ..... 3
  - Safety Reverences ..... 3
  - Registered Trademarks ..... 4
  - Important Information ..... 4
  - Non-warranty ..... 4
- 2. GENERALL INFORMATION ..... 5
- 3. DEVICE DESCRIPTION ..... 5
- 4. INSTALLATION ..... 6
  - 4.1 Front-side USB Disketten Emulator ..... 7
  - 4.2 One pen drive replaces one floppy ..... 8
  - 4.3 One pen drive replaces 100 floppies ..... 9
  - 4.4 PC access to pen drive with only one floppy image ..... 10
  - 4.5 PC access to pen drive with up to 100 floppy images ..... 11
- 6. INTERFACE DESCRIPTION ..... 12
  - 6.1 Back-side USB Disketten Emulator ..... 12
  - 6.2 Jumper description ..... 13
  - 6.3 Floppy Controller Interface ..... 15
- 7. SPECIFICATIONS USB FLOPPY EMULATOR ..... 16

# 1. Introduction

## Legal Information

COPYRIGHT © 2009 ipcas GmbH

All rights reserved. No part of this document may be copied out, copied, reproduced, or transferred in other form without the previous express written approval of the ipcas GmbH. Misprint, mistakes and changes are left.

In so far as legally as possible, we cannot accept any liability for consequential damage caused by using this guide. In other respects we shall accept liability for intention and gross negligence only. We have done our utmost to ensure that the information in this user guide is complete, accurate and up to date. We don't give any warranty for the correctness of the made details or for the applicability of the described Product for any special purpose. We cannot provide any warranty that changes to third-party equipment, which is referred to in this guide, will have no effect on the applicability of the information provided here. The author reserves all rights, including the right to reproduce this guide in full or part in any form. The content is subject to change without prior notification. The product is subject to technical change without prior notification.

## Safety Reverences

As is the case with all electrical equipment, there are some basic safety precautions that you should apply. These safety precautions are primarily for your safety but also to prevent damage to the device. Settings not described in this guide and changes to the device electronics are to be carried out by an authorized vendor only. Read the user guide carefully and keep it to hand.

Make sure that the device is placed on a stable and flat surface. Make also sure that for rail-mounted devices the top hat rail is sufficiently grounded and the rail spring has good contact.

Use the device at a tempered, dust- and vibration free place.

Excessive heat will damage the device. Therefore it should not suspend to high temperatures (No mounting near heat sources. No direct sunlight.). Device shouldn't be used at exceptional humidity. Make sure no liquids or particles can get into the device.

Don't place the device near to magnetic fields because this can be responsible for data loss.

(Never make any changes to the device that is not described in the user guide.) It's forbidden to run the device with another supply voltage which isn't described for the device. This could damage the device and you will have to pay for the repairs. Only the authorized vendor may change the input voltage if this should become necessary.

The power supply must be free from overloads and other malfunction. The interfaces must be free from overloads, different potential and other malfunction. Otherwise the device could become damaged. Don't carry out any modifications in the device which are not described in this user guide. That could damage the device and the owner will be liable to pay the costs.

Make sure that the following conditions are fulfilled:

Use a suitable power supply unit. In case of any doubt, consult your supplier. The device should be used exclusively with the mains unit supplied. Using a different power supply unit may lead to the device being damaged. If the device is damaged, disconnect it from the mains. Arrange for immediate repair. Make sure that the mains socket is located near to the device and is easily accessible. You have to pull the mains plug completely to disconnect. In case of using an extension cable or multiple contact plug, the maximum power rating must not be exceeded. The mains cable must be protected against damage by yourself. Do not place anything on the cable and place it on a safe ground so that there is no danger of stepping on or tripping over it. A damaged mains cable must be replaced immediately. Make sure that the mains cable is disconnected before starting to clean the device. Use a dry cloth only. Do not use any liquid or aerosol cleaning agent.

# Registered Trademarks

All used Trademarks in this Document are stated for identification purposes and may be the property of the various holders.

## Important Information

Please, pay attention to electrostatic unloadings. Use a suitable work station for the work with CMOS components. Before you consult the customer service of your supplier, you should notice the notes in this manual. Even during the warranty period, costs may arise by utilising the customer service if the concerned fault or problem can be corrected from the customer himself on the basis of this guide describing the solution or remedy. To clean the device just use dry cloth. Don't use liquid or aerosol cleaner. Removing the serial number will void the warranty rights. Damage caused by inappropriate packing will not be borne by the forwarding agent / insurance company.

## Non-warranty

The ipcas GmbH is not liable for the use of Software or Products which are mentioned in this document. Also this company is not liable if use of these products hurt any existing or future licence or patent laws from third party. ipcas GmbH reserves the right to execute modifications of the contents without previous announcements.

## Limited warranty

The ipcas GmbH guarantees the final consumer (purchaser) in the case of appropriate use that the device will be for a period of 24 months without any material damage and free of caused labour costs. In case of production errors or damaged material, the ipcas GmbH will do anything to restore the normal operating status (i.e. repair or exchange parts or the whole product), within the warranty period and if the receipt is available. In free discretion of the ipcas GmbH, the exchange may contain new or as good as new devices or parts which have the same functionality like the original device.

This warranty will expire instantly if the device is modified, used incorrect or sportive/careless damaged. This also takes effect if the product is affected through force majeure or by using the device out the proper working conditions.

Only the purchaser has claim for repair or exchange. Other pretensions do not exist. These warranty conditions substitute all other warranties or warranty services, no matter if assertive, explicit or implicit. They don't mean that the product came out for certain or economic intention or any other intention. Not at all and in no way the ipcas GmbH is liable for indirect or any damage or consequential damage which the customer eventually suffers.

The ipcas GmbH doesn't give any warranty that the software / hardware match your requirements or work accurately and faultless. With the installation of the software / hardware you take not only the full responsibility for the use of the software / hardware but also for the expected results, the installation, the application and the achieved results which were made by the use of the software.

For claiming your warranty service, please approach your Vendor, who will send back the device to the ipcas GmbH. If there's no receipt together with the device or if the whole thing isn't under the warranty period anymore, ipcas will repair or change the damaged parts (own choice) and charge the parts and the working time. Repaired or replacement devices will be sent back to the added address.

### **CAUTION:**

**Product warranty will be void if the serial number is removed.  
Through unsuitable packing caused damage wouldn't be overtaken by  
the carrier / insurer.**



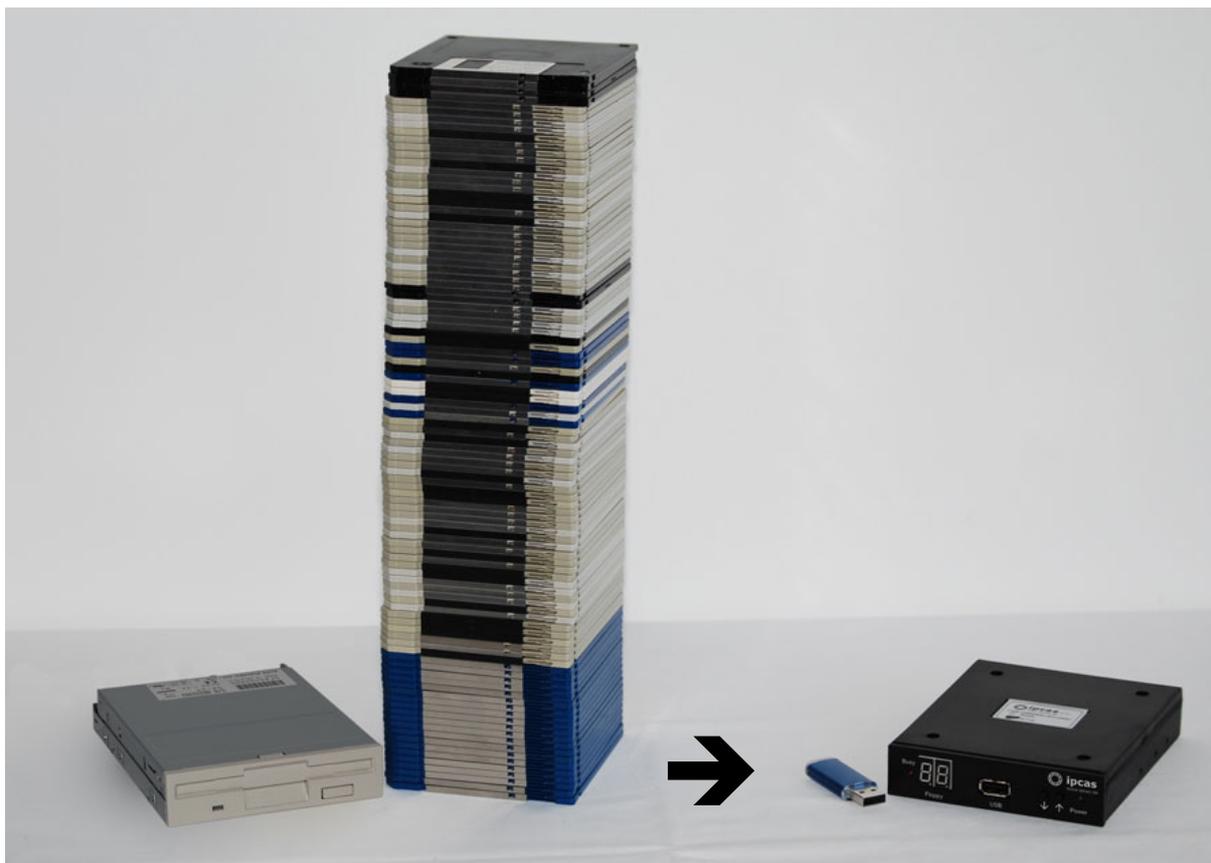
## 2. General information

This manual has been compiled to describe our product's hardware and commissioning. Only general technical knowledge is required for the installation.

## 3. Device description

The USB Floppy Disk Emulator of ipcas GmbH replaces legacy disk drives. The floppy is replaced by a USB Stick. Up to 100 virtual floppy disks can be stored on one USB Stick.

Retrofitting of your machines/systems is no longer required.  
Just replace the disk drive 1:1.



Comparison: Left: 3.5 inch disk drive with 100 x 1.44 MB floppies  
Right: ipcas USB Floppy Disk Emulator with USB Stick

In the industrial sector many machines are still equipped with floppy disk drives. The floppy disk is often the only means of importing updates or reading out data. This could become a source of future problems.

Floppies are sensitive and short-lived. The maintenance of disk drives is expensive, and quite often they can be no longer replaced.

The ipcas Floppy Disk Emulator depends on USB Sticks as data carriers, which are far more compact, practical and long-lived than the old-fashioned floppy disk. So the ipcas "Floppy" makes your machine/system fit for the future.

The ipcas Floppy Disk Emulator can also replace other forms of disk drives and disk storage systems. Refer to the comparison with a 5¼ inch floppy disk drive with 1.2 MB floppies.



A 5¼ inch installation frame for 3.5 inch disk drives and a 34-pin adapter are optionally available.

## 4. Installation

Please connect the Floppy Emulator as described under [6.1 Floppy Emulator – back](#).

**Caution:** The red Busy LED lights up during a read or write process (when data is saved on or read from the virtual floppy). Please do not ever remove the pen drive or use the selection keys (↓↑) during such a process. Always wait until a read or write process has been completed before you carry out another task. Otherwise, you may cause data loss.



## 4.1 Front-side USB Disketten Emulator



LED 1 – Busy (red): lights up when system is reading or writing.

LED 2 - Power (green): lights up when the voltage supply is connected.

Display (2 digits): displays the status of the disk drive or the currently selected floppy (00 to 99).

USB: USB socket (USB type A) to connect a USB Stick (the data carrier replacing the floppy disk).

↓↑: Selection button to select the desired virtual floppy disk (00-99 if previously preset)

When the virtual floppy changes from one to another, dots light up next to the digits. Please wait before you use the disk drive until the dots disappear.

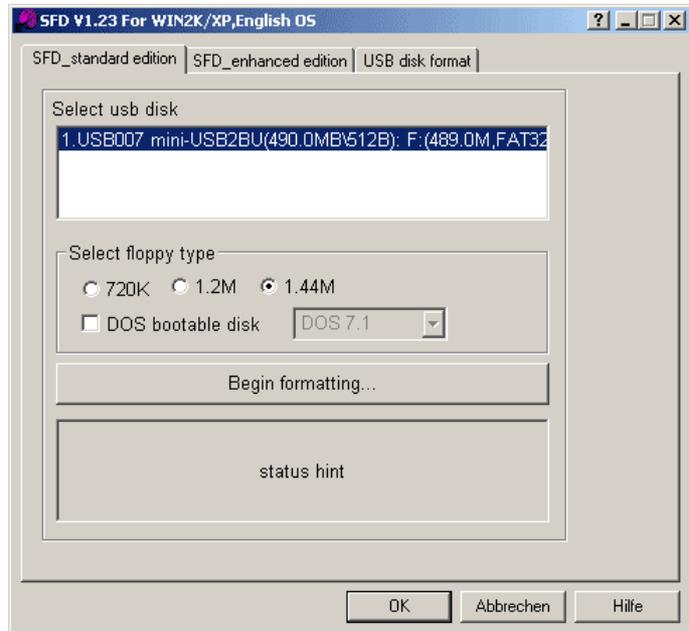
**Caution:** When LED 1 – Busy – lights up, do not under any circumstances remove the USB Stick or deploy the selection button, or else you might incur data losses. The virtual floppy images must be in correct sequence in order to be selected with the selection button.

## 4.2 One pen drive replaces one floppy

You must format the pen drive first before you can use it as a data carrier for the Floppy Emulator.

**Caution:** This process deletes all data on the pen drive.

1. Start Floppy Manager tools "V123\_SFD.exe"
2. Insert pen drive into your computer
3. Select tab "SFD\_standard edition"
4. Select pen drive "Select usb stick"
5. Select floppy size "Select floppy type"
6. Select start button "Begin formatting"

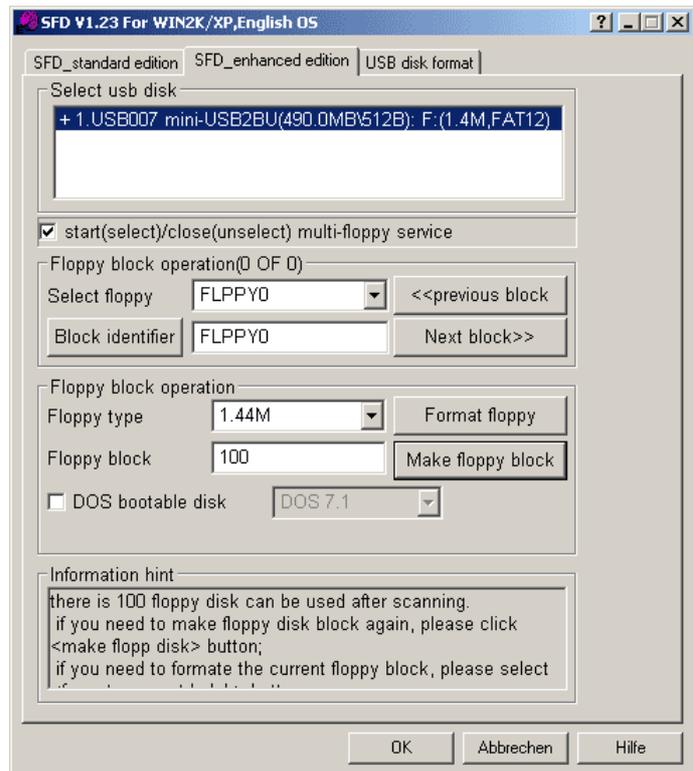


## 4.3 One pen drive replaces 100 floppies

You must first format your pen drives before you can use them as data carriers for the Floppy Emulator.

**Caution:** This procedure deletes all data on your pen drive.

1. Start Floppy Manager tools "V123\_SFD.exe"
2. Insert pen drive into your computer
3. Select tab "SFD\_enhanced edition"
4. Select pen drive "Select usb stick"



5. Select "start/close multi-floppy service"
6. Select floppy size and number of floppies on your pen drive (blocks, images) "Floppy block operation"
7. Select start button "Make floppy block"
8. You must first complete the selection "start/close multi-floppy service" before you terminate the program or remove your pen drive. **Caution:** Data loss may occur otherwise if you do this before the "multi-floppy service" has been completed.

### Please note:

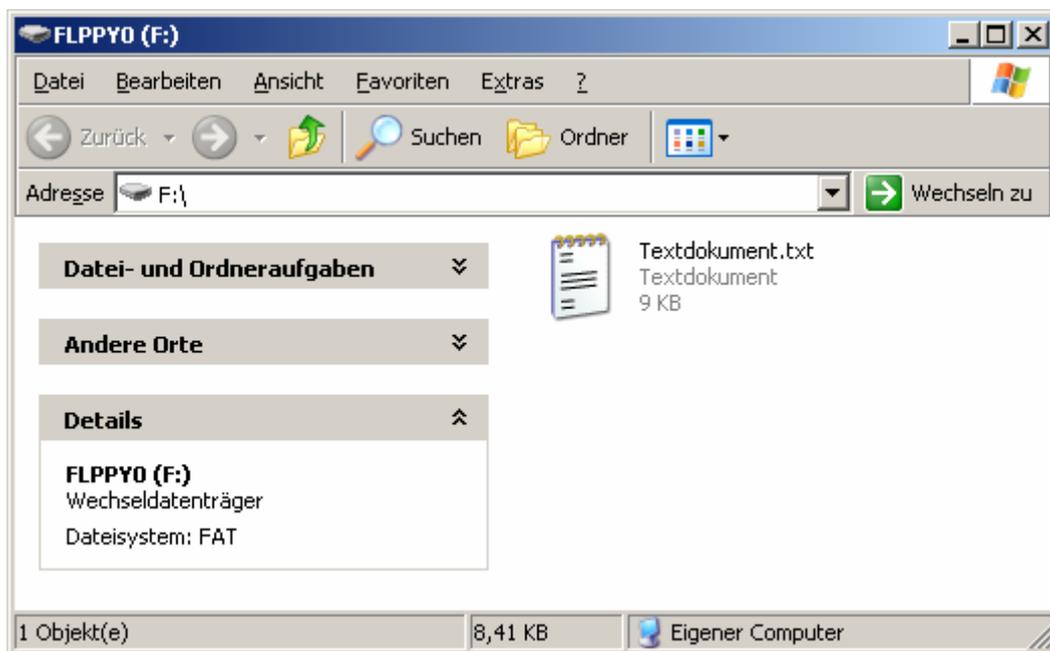
- You can make images bootable with "DOS bootable disk".
- The Floppy Emulator starts with image "00" when you switch it on.
- Using "Format floppy" you choose to format only a currently selected floppy.
- One image uses approx. 7 MBs on your pen drive. For 100 images, your pen drive should hold 1 GB.

## 4.4 PC access to pen drive with only one floppy image

**Caution:** Access to a PC is only enabled if you use non-proprietary file systems.

Absolutely NO additional software is required.

The first floppy image (00) is automatically recognized by your PC and is mounted under the next vacant drive letter.



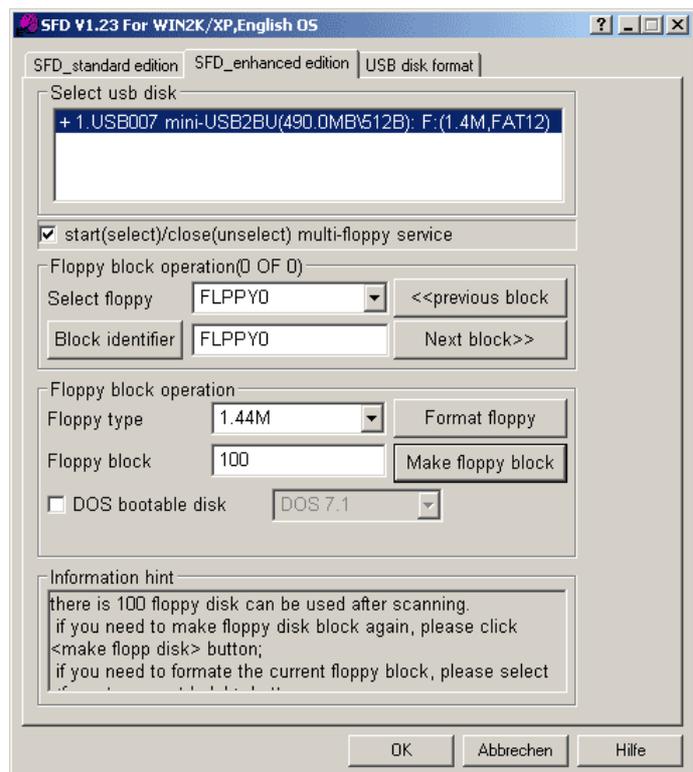
## 4.5 PC access to pen drive with up to 100 floppy images

**Caution:** Access to a PC is only enabled if you use non-proprietary file systems.

The Floppy Manager tool "V123\_SFD.exe" is required.

The first floppy image (00) is automatically recognized by your PC and is mounted under the next vacant drive letter. If you want to mount an image other than the first one, you can do this with the Floppy Manager tool.

1. Start Floppy Manager tool "V123\_SFD.exe"
2. Insert pen drive into the computer
3. Select tab "SFD\_enhanced edition"
4. Select pen drive "Select usb stick"
5. Select "start/close multi-floppy service"
6. Select desired floppy image on the pen drive with "Select floppy"
7. Now the selected image is mounted under the current drive letter.

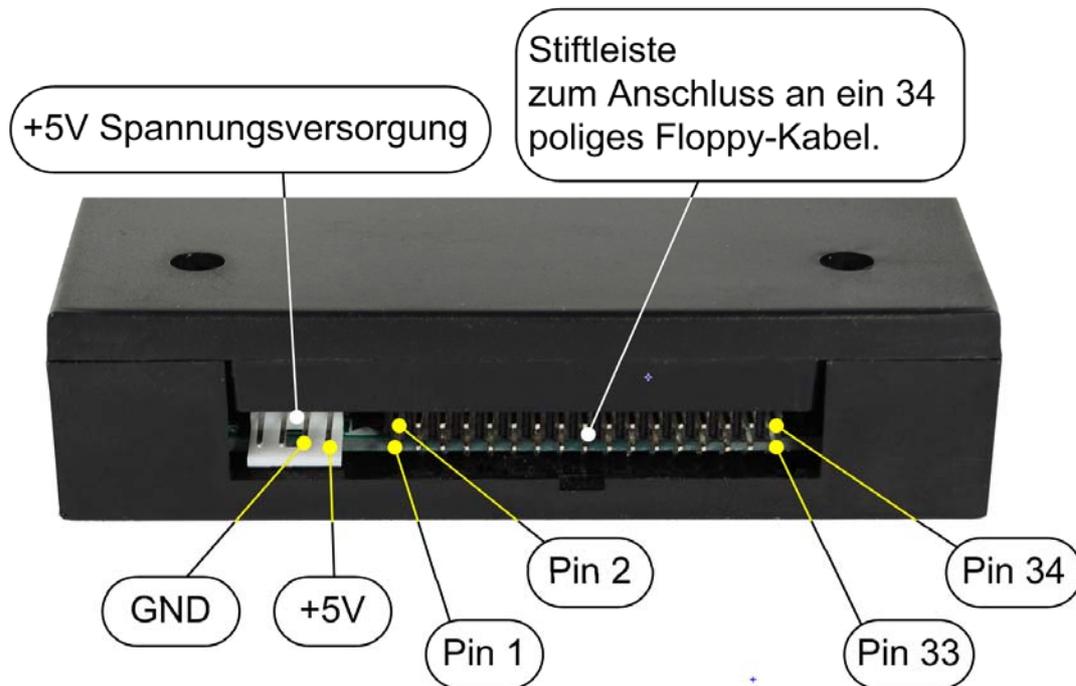


8. The selection "start/close multi-floppy service" must be completed before you terminate the program or remove the pen drive. **Caution:** Data loss may occur otherwise if you do this before the "multi-floppy service" has been completed.

**Please note:** You may assign a (new) label to an image by using "Block identifier".

## 6. Interface description

### 6.1 Back-side USB Disketten Emulator



At the back of the disk drive you will find the connection for the voltage supply (+5V DC) and the 34-pin interface to connect the floppy disk drive controller.

Please check for correct polarity of voltage supply when connecting the floppy disk drive. GND (ground) is usually indicated by a black wire, and +5V by red wire.

Please also correctly attach the 34-pin connection cable.

On modern flat cables the 34-pin plugs have a gib at the bottom. When connecting, the gib has to settle into the corresponding sliding notch at the drive housing below the header.

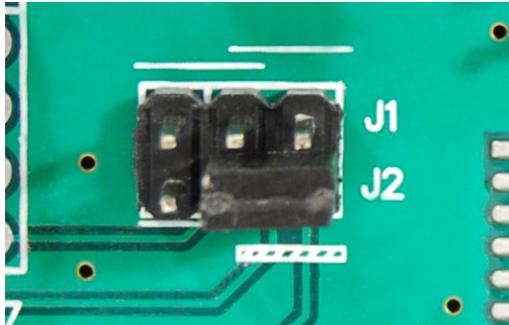
Also make sure the correct pin sequence is observed (Wire 1 on Pin 1, etc.). Wire 1 is usually indicated by color at the floppy cable (often red or blue).



**Caution:** If the connection cable is attached incorrectly the drive disk will not work (Most of the "Busy" LED lights up permanently in this state). Maybe it can be damaged.

## 6.2 Jumper description

The drive is selected with Jumper J2.



J2 Pin 2-3 is designed for drive mode 2 (Drive Select 1) by default.

The following options are enabled:

J2 1-2 connected: Drive Select 0 (Drive A)

J2 2-3 connected: Drive Select 1 (Drive B)

**Please note:** If a twisted wire is used, the controller recognizes Drive Select 1 (Drive B) as Drive A.

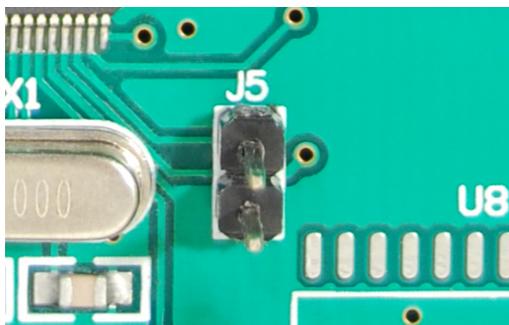
In some systems the drive is selected by using Motor Enable.

J1 1-2 connected: Motor Enable A

J1 2-3 connected: Motor Enable B

**Caution:** Please never use J1 and J2 at the same time. Doing so may cause damage to your device.

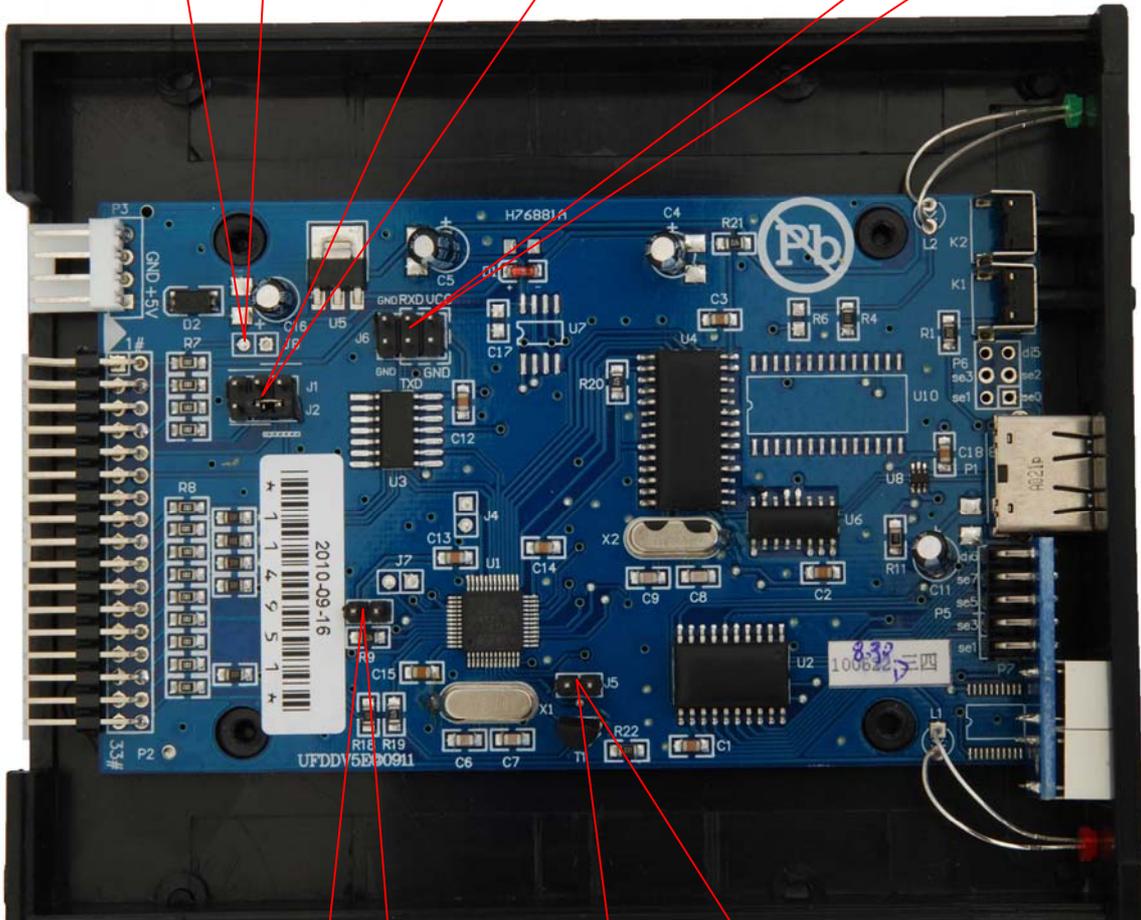
Jumper J5 influences the signal setting on Pin 34. Some systems – such as the Shugart – Interface use Pin 34 for the Ready signal.



J8 Density Select  
on pin 2 for few  
special interfaces  
open 1.44MB  
close 720KB  
not assembled

J1 & J2  
J1 is for Motor EnableA  
or Motor EnableB  
J2 is for Drive Select0  
or Drive Select1

J6 internal use

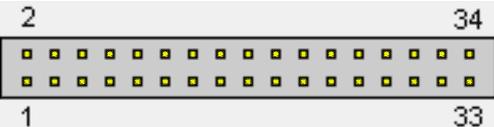
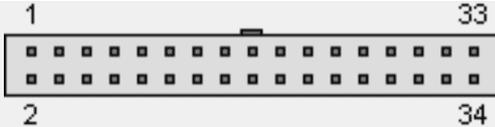


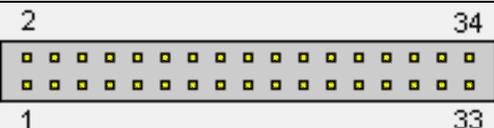
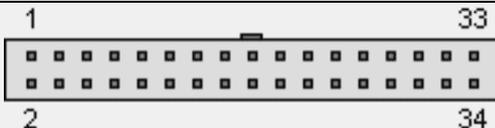
J3 internal use

J5 Ready signal selection on pin 34  
Open inactive  
Close active with low level

Note: If you have a standard Shugart device then you get the select signal about Motor On pin 16 (J1 left) and the Ready signal (J5 close) on pin 34

## 6.3 Floppy Controller Interface

Standard IBM-AT Interface			
 <p>34 pin male connector at the motherboard</p>		 <p>34 pin female connector at the cable</p>	
Pin	Name	Direction FDC-FDD	Description
2	/REDWC	→	Reduced Write Current (Density Select)
4	-	-	Reserved
6	-	-	Reserved
8	/INDEX	←	Index
10	/MOTEA	→	Motor Enable A
12	/DRVSB	→	Drive Select B
14	/DRVSA	→	Drive Select A
16	/MOTEB	→	Motor Enable B
18	/DIR	→	Direction Select
20	/STEP	→	Step
22	/WDATE	→	Write Data
24	/WGATE	→	Write Gate (Floppy Write Enable)
26	/TRK00	←	Track 0
28	/WPT	←	Write Protect
30	/RDATA	←	Read Data
32	/SIDE1	→	Side Select (Head Select)
34	/DSKCHG	←	Disk Change
Pin 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33 GND			

Standard Shugart Interface			
 <p>34 pin male connector at the motherboard</p>		 <p>34 pin female connector at the cable</p>	
Pin	Name	Direction FDC-FDD	Description
2	/DSKCHG	→	Disk Change
4	-	-	Reserved
6	-	-	Reserved
8	/INDEX	←	Index
10	/DS0	→	Device Select 0
12	/DS1	→	Device Select 1
14	/DS2	→	Device Select 2
16	/MON	→	Motor On
18	/DIR	→	Direction
20	/STEP	→	Step
22	/WDATE	→	Write Data
24	/WGATE	→	Write Gate (Floppy Write Enable)
26	/TRK00	←	Track 0
28	/WPT	←	Write Protect
30	/RDATA	←	Read Data
32	/SIDE1	→	Side Select (Head Select)
34	/RDY	←	Drive Ready
Pin 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33 GND			

## 7. Specifications USB Floppy Emulator

USB Floppy Emulator	Built -in version
Interfaces	<ul style="list-style-type: none"> <li>➤ 1 x USB socket type A</li> <li>➤ 1 x 4-pin socket for voltage supply</li> <li>➤ 1 x 34-Pin socket board for 3.5" standard floppy controller connection</li> </ul>
Compatibility	<ul style="list-style-type: none"> <li>➤ FAT12 file system interpretation</li> <li>➤ Fixed sector size: 512 Byte / Sector</li> <li>➤ 3.5"-1.44MB: 80 Tracks / 18 Sectors</li> <li>➤ 5.25"-1.2MB: 80 Tracks / 15 Sectors</li> <li>➤ 3.5"- 720kB: 80 Tracks / 9 Sectors</li> </ul>
Diagnostic LEDs	Power, Busy
Display	2 digit 7-segment display to show current virtual floppy and diagnostic
Voltage supply	5 V DC (voltage range 4,5 – 5,5 V DC) 4-pin-voltage supply socket for 3.5 inches drives
Housing	Plastic housing
Frame size	3.5 inches
Dimensions B/H/T	Approx. 100mm / 25mm / 122mm
Temperature range	0° C to 65° C
Reative humidity	5 % to 90 % non-condensing
Scope of delivery	USB Floppy Emulator, USB-Stick, Floppy Manager Tool And manual on USB-Stick
Purchase rder number	0202042-1

### **Der Kontakt**

#### **ipcas GmbH**

Gundstraße 15

D-91056 Erlangen

Telefon: +49 (0)9131/ 7677-0

Telefax: +49 (0)9131/ 7677-78

Internet: <http://www.ipcas.de>

E-Mail: [info@ipcas.de](mailto:info@ipcas.de)