

EMUFDD v31 – NETWORK USER MANUAL

The most reliable and configurable Universal Floppy HW Emulator

ALL-INCLUSIVE PROFESSIONAL INSTALLATION SERVICE AVAILABLE

Custom/non-standard floppies analysis & development available



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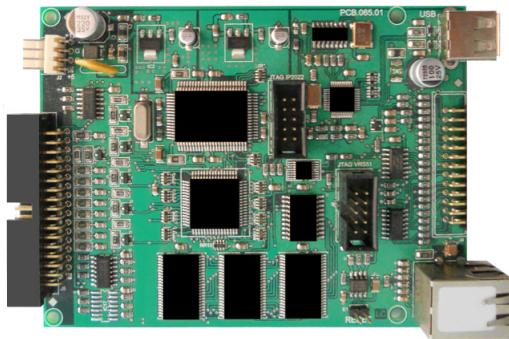
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Section 1. DATASHEET



Retrofit services for the industry, from the machinery to the solution

EMUFDD Tech-Homepage :
www.embeddedsw.net

Designer & Customer Support :
embedded@embeddedsw.net

EMUFDD scores a unique 100% rate of successful floppy replacements:

- we freely help customers, **before purchasing**, in collecting all the needed infos;
- we provide **floppy analysis service** to identify/backup/emulate all floppy disks;
- we provide free software capable of doing **universal backup** of floppy disks;
- we provide free software capable of full **floppy drive virtualization**.

ALL-INCLUSIVE PROFESSIONAL INSTALLATION SERVICE AVAILABLE

We're able to come to you and directly retrofit all kind of existing industrial machinery, quickly, safely and at an affordable price:

- no need to change the CNC/PNC/control;
- no need to change any electronic;
- backup/digitalization/testing of all kind of data/program floppy disks;
- backup/digitalization/testing of all system/boot/recovery floppy disks;
- absolutely no need to rewrite programs;
- new programs saved directly on EMUFDD;
- shortest production stopping time;
- EMUFDD training of the worker.

DIMENSIONS – 3.5 " FORM FACTOR	
HEIGHT [H]	1,00 in / 2,54 cm
WIDTH [W]	4,00 in / 10,16 cm
DEPTH [D]	5,30 in / 13,46 cm
WEIGHT	0,80 lb / 363 g

HARDWARE	
INTERNAL MEMORY TYPE	1.5 MB FRAM non-volatile memory
INTERNAL MEMORY RELIABILITY	10^{14} R/W cycles = 50 years 24/7
POWER ON TIME	Less than (<) 500 ms
USER FRONT INTERFACE	USB keys with FAT format – 100 floppy disks Ethernet 10T network – unlimited floppy disks
FLOPPY REAR INTERFACE	34 pin flat cable (3.5" & 5.25") + 5V power supply 26 pin flat cable (integrated power supply) 26 pin slim cable (integrated power supply) USB 1.0 standard external floppy SCSI 50 pin standard floppy
SOFTWARE	
FIRMWARE RELEASE	Revision 31 (July 2017)
CONFIGURATION	100% Jumperfree / Plug'n'Play
FIRMWARE UPGRADE SUPPORT	Yes
NETWORK SOFTWARE	XP, Win7, Win8, Win10, Server, x32 & x64
ENCODING	FM / MFM / <i>custom on request</i>
SPEED	300 rpm / 360 rpm / <i>custom on request</i>
DATA CLOCK	From 125 KHz (the old 8") up to 500 KHz (the modern 3.5")
SUPPORT	Softwareless Mode: FAT12 – 360KB / 720KB / 1.200MB / 1.440MB Raw Image Mode: <i>Any existing standard or custom on request</i>
SOME COMMON EXAMPLES...	80/2/18x512 – MFM: 500 KHz – 300 rpm – 1.440MB 80/2/15x512 – MFM: 500 KHz – 360 rpm – 1.200MB 80/2/9x512 – MFM: 250 KHz – 300 rpm – 720KB 40/2/9x512 – MFM: 250 KHz – 300 rpm – 360KB
MORE LESS COMMON EXAMPLES...	83/2/18x512 – MFM: 500 KHz – 300 rpm – 1.494MB 80/2/32x256 – MFM: 500 KHz – 300 rpm – 1.280MB 80/2/5x1024 – MFM: 250 KHz – 300 rpm – 800KB 80/2/18x256 – MFM: 250 KHz – 300 rpm – 720KB 80/2/16x256 – MFM: 250 KHz – 300 rpm – 640KB
OLD & RARE EXAMPLES...	80/2/5x1024 – FM: 250 KHz – 300 rpm – 800KB 80/2/18x256 – FM: 250 KHz – 300 rpm – 720KB 80/2/32x128 – FM: 250 KHz – 300 rpm – 640KB 80/2/16x128 – FM: 125 KHz – 300 rpm – 320KB
NEED MORE?	<i>Ask customer support for help in identifying your floppy disk!</i>

“Is EMUFDD compatible with my machinery?”

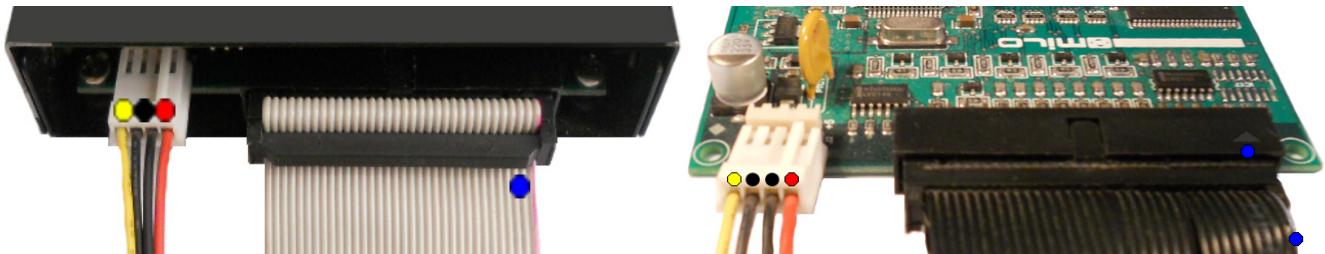
“Yes, because EMUFDD it's the best existing professional emulation product. We will:

- provide you extensive pre-selling support and specifically analyze your target;
- configure a 100% custom EMUFDD solution, just for you;
- help you remotely during the installation, using live Skype connection.”



Gallery of custom EMUFDD installations worldwide

Section 2. HARDWARE INSTALLATION



EMUFDD installation works like any other real floppy drive installation:

- 2.1) connect the power supply;

	=	+12V power supply (not connected)	Optional
	=	two GND lines (joined, connect one or both)	Required
	=	+5V power supply	Required

- 2.2) connect the 34pin flat cable.

	=	pin-1 mark (flat cable / connector)
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No system driver or additional software needs to be installed on the host system.

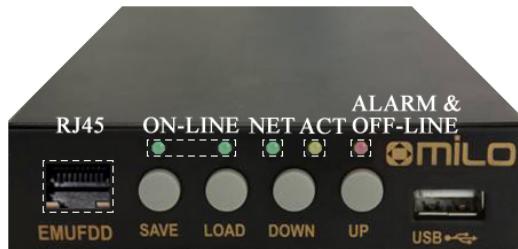


Be sure to match the connector pin-1 mark with the flat cable pin-1 mark !



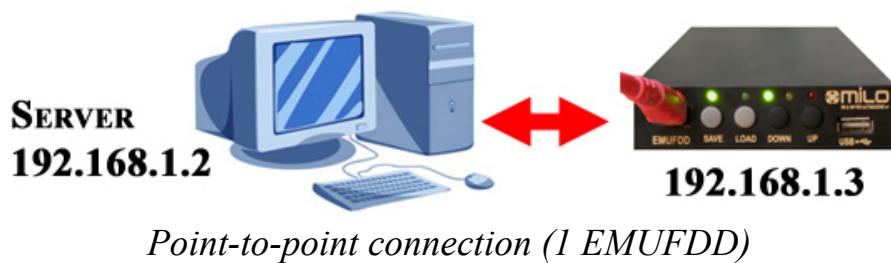
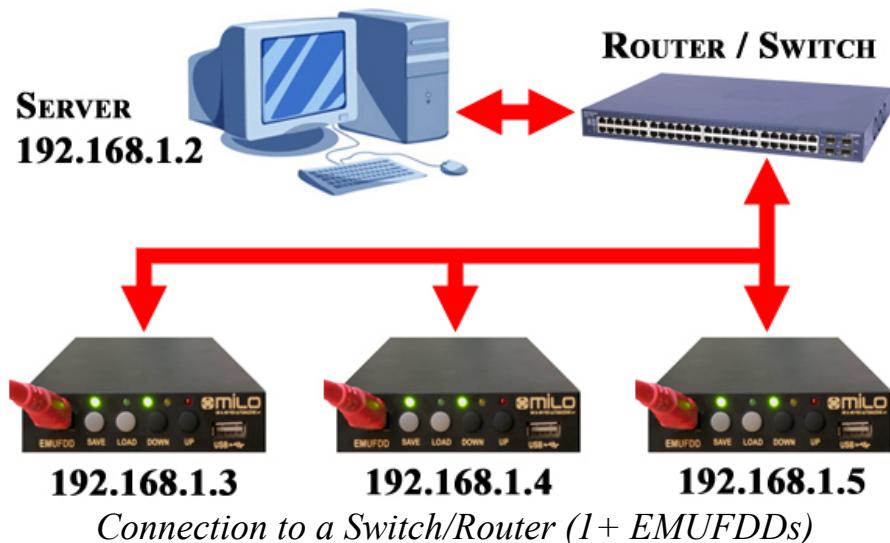
Sometimes flat cables are inverted. Please check whether the cable is coloured/markd at pin-1 (standard) or pin-34 (inverted) !

Section 3. NETWORK INSTALLATION

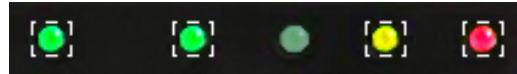


EMUFDD is a true Ethernet 10Mb full-duplex device:

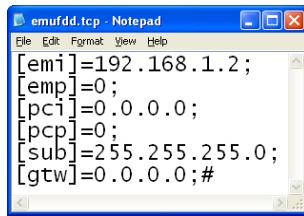
- **full POSIX / WinSock 2** software compatibility on the PC server;
 - **full TCP/IP & RJ45** hardware compatibility on the EMUFDD;
 - **no need** to install any extra driver on both the PC server and the machinery;
 - **no need** to install any extra hardware on both the PC server and the machinery.
- 3.1) after hardware installation connect (using the RJ45 front connector) all the EMUFDDs to the local network, that will be using only **static IP addresses** ([WINXP](#), [WIN7](#)). It's possible to use many EMUFDDs, grouped using a network switch/router. It's also possible to use a single EMUFDD, connected point-to-point to the PC server;



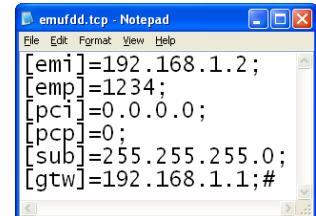
- 3.2) each EMUFDD needs to be configured with an IPv4 address, the local network submask and, in case you're using a router, the router/gateway address. The configuration is loaded into the EMUFDD using a “**emufdd.tcp**” text file, on a USB key. Plug the USB key in, press LOAD and wait until the device will auto-reset (all leds blink very fast);



[emi]=xxx.xxx.xxx.xxx;	↔	IPv4 address of EMUFDD
[emp]=xxx;	↔	Port of EMUFDD (0=1024 default)
[pci]=0.0.0.0;	↔	(Reserved for advanced custom features)
[pcp]=0;	↔	(Reserved for advanced custom features)
[sub]=xxx.xxx.xxx.xxx;	↔	IPv4 subnet network mask
[gtw]=xxx.xxx.xxx.xxx;	↔	IPv4 address network gateway
#	↔	End of configuration file



Example 1: *Minimum settings*
+ default EMUFDD port
+ no gateway



Example2: *Full settings*
+ custom EMUFDD port
+ network gateway

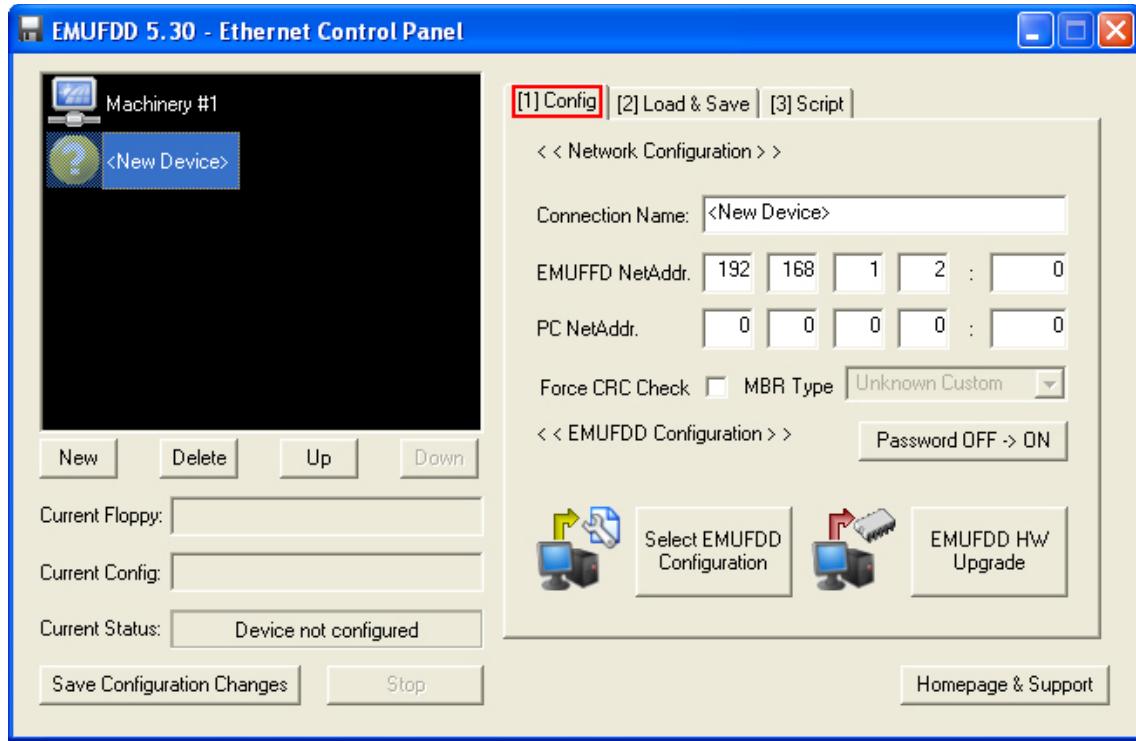
- 3.3) each EMUFDD can be reconfigured how many times you need and you're completely free to change the local network at any time. To check that the EMUFDD is correctly configured you can use the standard “**ping**” (check IP address) and “**arp**” (check MAC address) DOS commands;

```
C:\> ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\> arp -a
Interface: 192.168.1.1 --- 0x4
      Internet Address          Physical Address          Type
        192.168.1.2              12-34-56-78-9a-bc    dynamic
C:\>
```

- 3.4) download the latest network software, always & freely available. The software is completely portable, doesn't need any installation and can run in user mode. All your settings will be saved in a “**emufdd.ini**” file (don't delete it !);

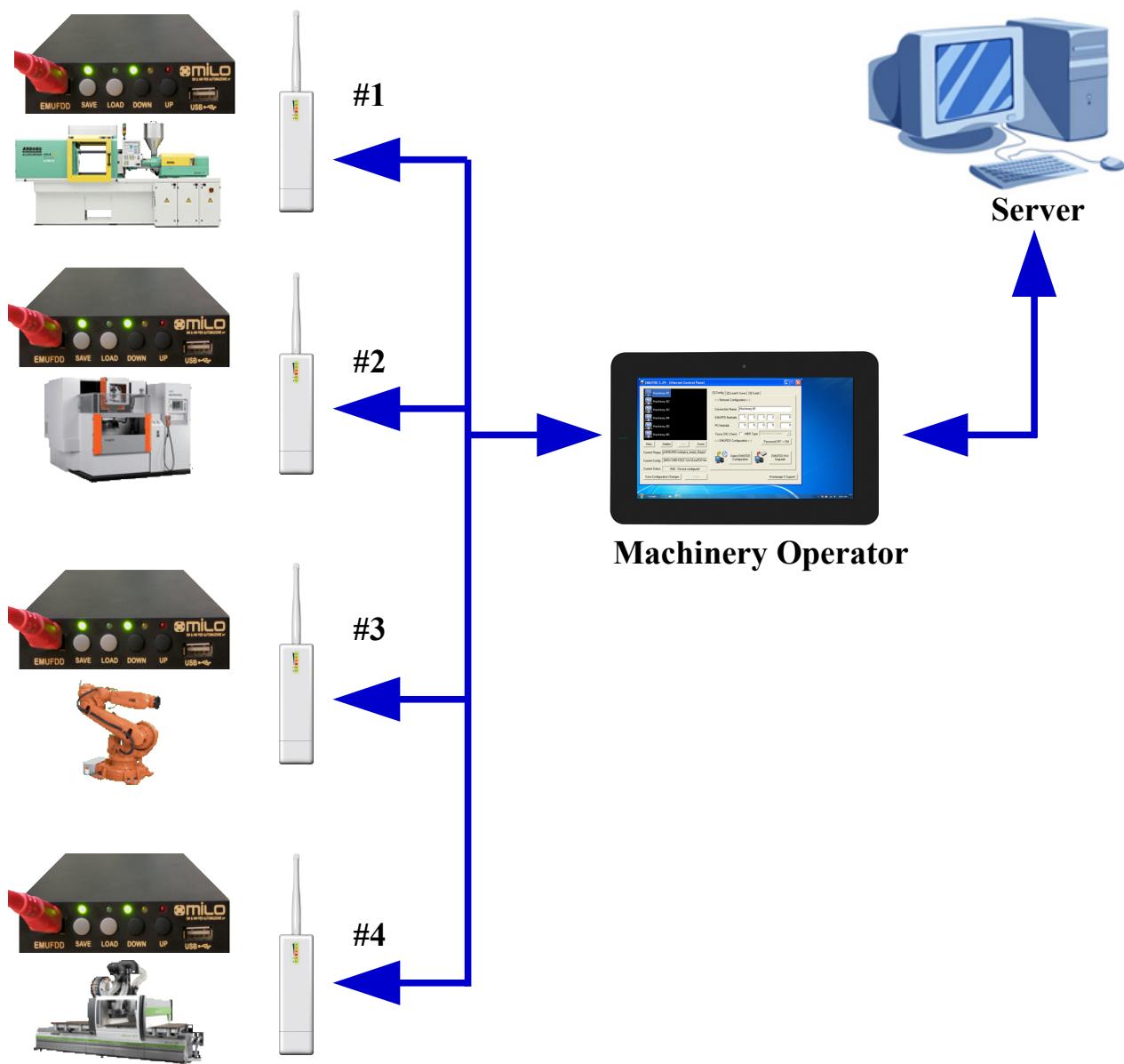


- 3.5) run “**EmufddEthPanel**”. For each EMUFDD connected to the local network apply the following configuration steps:

- Click New and a new EMUFDD connection will be created;
- Go to the [1] Config right panel;
- Change the Name (<New Device>) with the name of the machinery;
- Insert the EMUFDD's IPv4 network address and port in EMUFDD NetAddr; (see 3.2 “emufdd.tcp”: [emi] = xxx.xxx.xxx.xxx; [emp] = xxx;)
- If you have more than one network interface on your PC, then insert its IP address in PC NetAddr. Otherwise leave 0.0.0.0:0 = default network;
- Click Select EMUFDD Configuration and select the .cfg file that the customer assistance will send you, to connect to the machinery;
- Now the EMUFDD connection is configured.

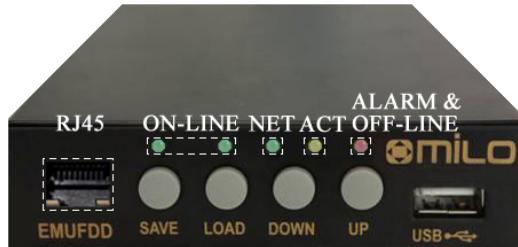
Section 4. WIRELESS NETWORKING

EMUFDD is a true Ethernet 10Mb full-duplex device and is transparent to any standard wireless bridge and/or extension. Customers can ask to get our official wireless extension or install any off-the-shelf full duplex product.



Example: *Different machinery #1 (= plastic injection), #2 (= EDM), #3 (= robot) and #4 (= wood working) are uniformly connected to the same WLAN. Machinery operator is able to access locally, in front of the machinery, all the programs that are phisically stored only in the remote server. Extremely easy and fast uploading and downloading, using any common Windows based tablet.*

Section 5. INTRODUCTION & EMULATION CYCLE



EMUFDD is equipped with 1.5 MB of internal **FRAM** non-volatile memory:

- **no need** to keep the USB key plugged in;
- top-quality data storage and memory **reliability** (10^{14} read/write cycles);
- **unlimited** permanent internal memory (no battery, fully RoHS).

More than 50 years of non-stop read/write emulation at full speed.

Each EMUFDD can be used by different users with different skills:

- **normal** users can be allowed to load-only floppy disks (playback);
- **advanced** users can have full access to the program floppy disks;
- special floppy disks can be **permanently** write protected;
- **simplified** access available: 1 USB key = 1 floppy disk.

Just ask for your version, fully customized for your everyday's usage !

At power-on EMUFDD immediately (less than 500ms) begins its emulation cycle:

- the emulation engine waits for reading or writing requests from the host system, and any read/write floppy disk access will turn the ACT_LED on;

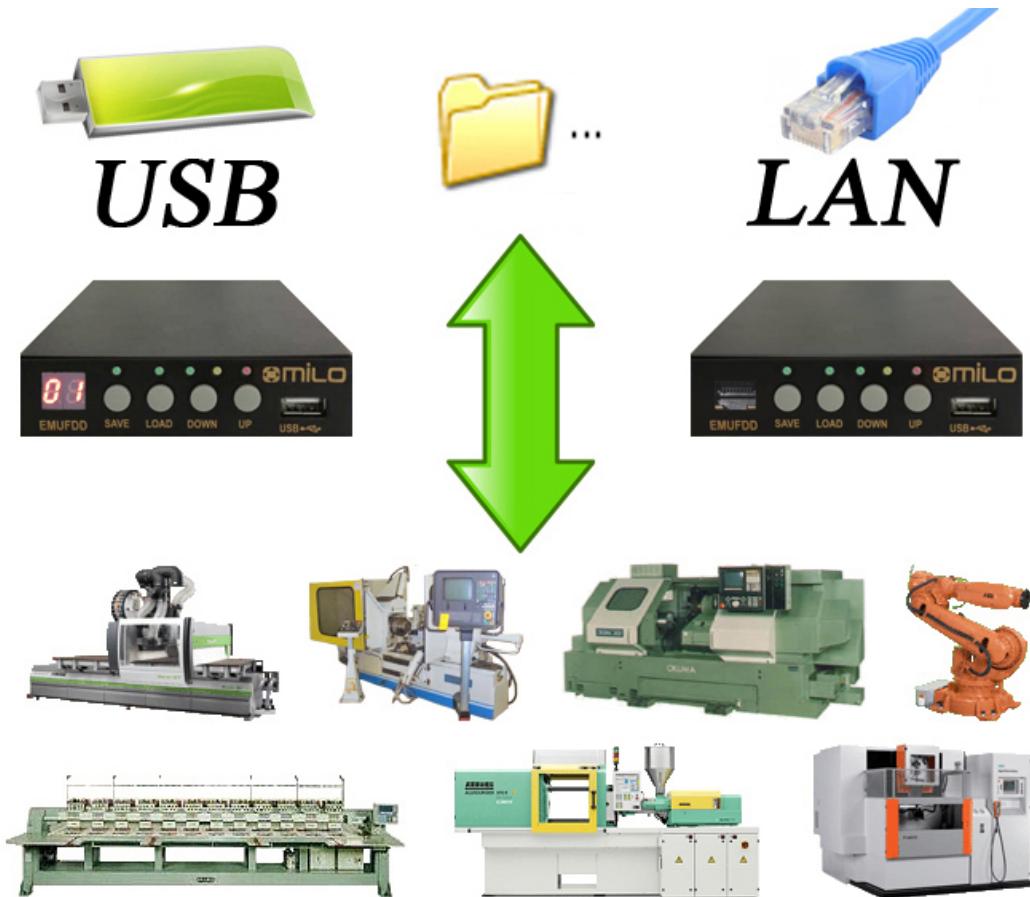


- the display continuously shows the On-Line sequence: [-] / [-].



Section 6. SOFTWARELESS MODE STORAGE

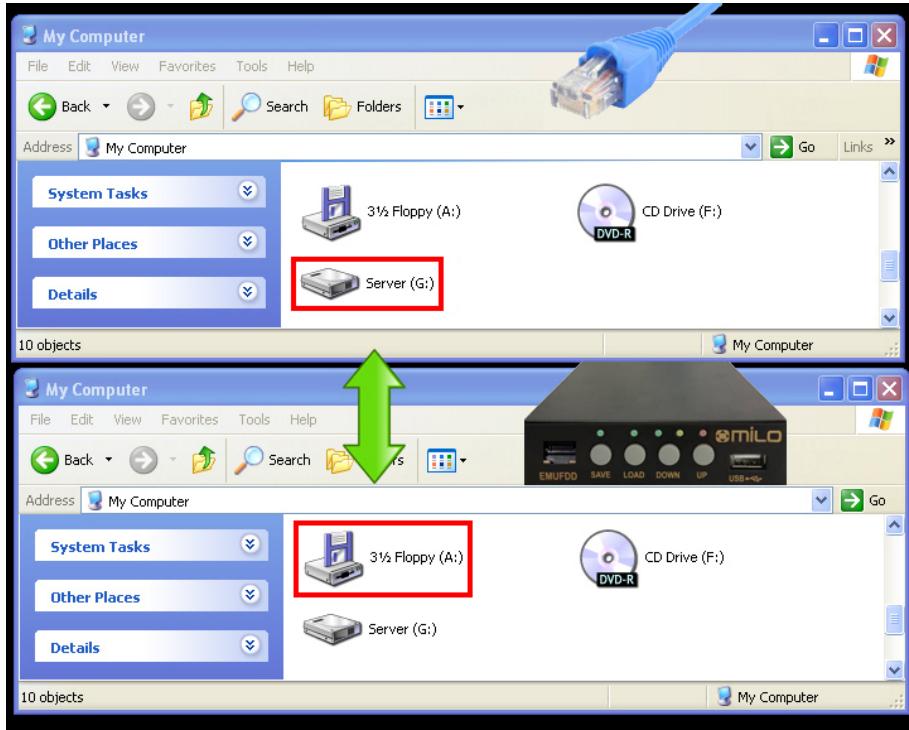
Data can be loaded/saved into/from EMUFDD's memory using the network software. No special partitioning is needed to access and copy'n'paste all the floppy disks. The softwareless mode, a.k.a. “**Translation**”, reads/saves all the floppy disks from/to subdirectories on the PC server and each one will be handled as the root of a different floppy disk:



PC	↔	EMUFDD
...\\example_floppy\\dir1\\file1.ext	↔	A:\\dir1\\file1.ext
...\\example_floppy\\dir2\\file2.ext	↔	A:\\dir2\\file2.ext
...\\example_floppy\\file3.ext	↔	A:\\file3.ext
...\\example_floppy\\file4.ext	↔	A:\\file4.ext
...

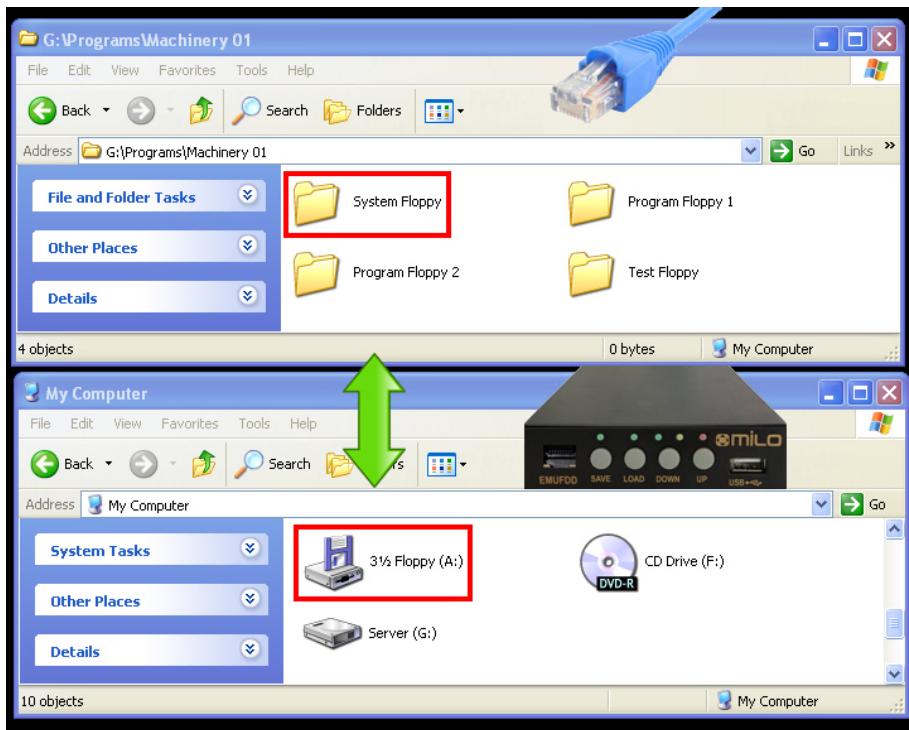
The translation feature:

- is available for 360 KB, 720 KB, 1.200 MB, 1.440 MB floppy disks;
- is available for both loading and saving;
- will preserve long filenames;
- will preserve all the hidden/read-only/system attributes.



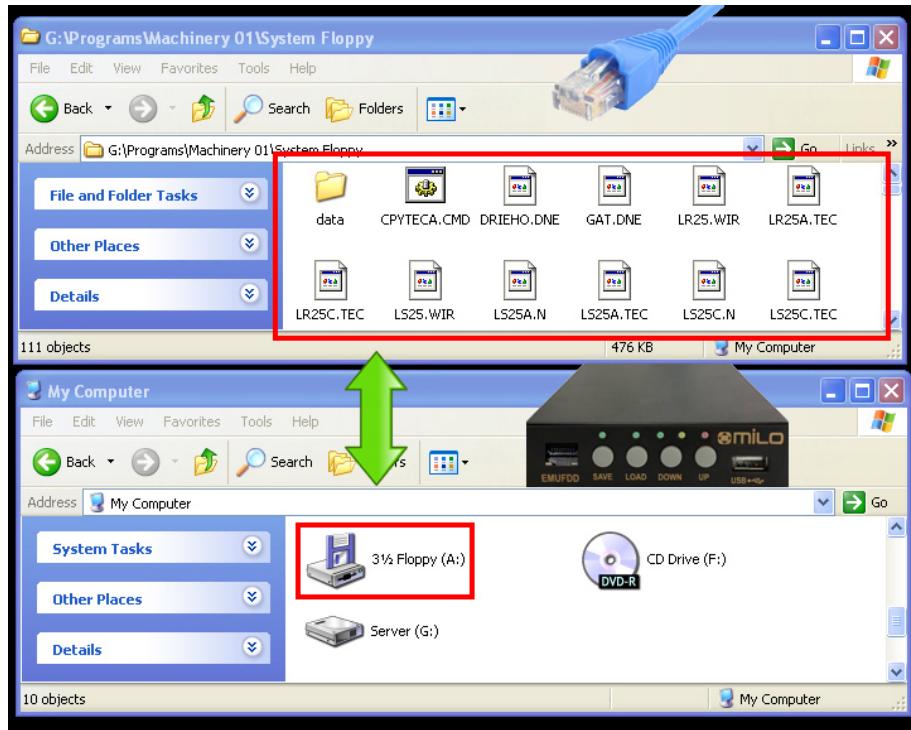
[*top window*] the PC server

[*bottom window*] EMUFDD (A:) in the machinery



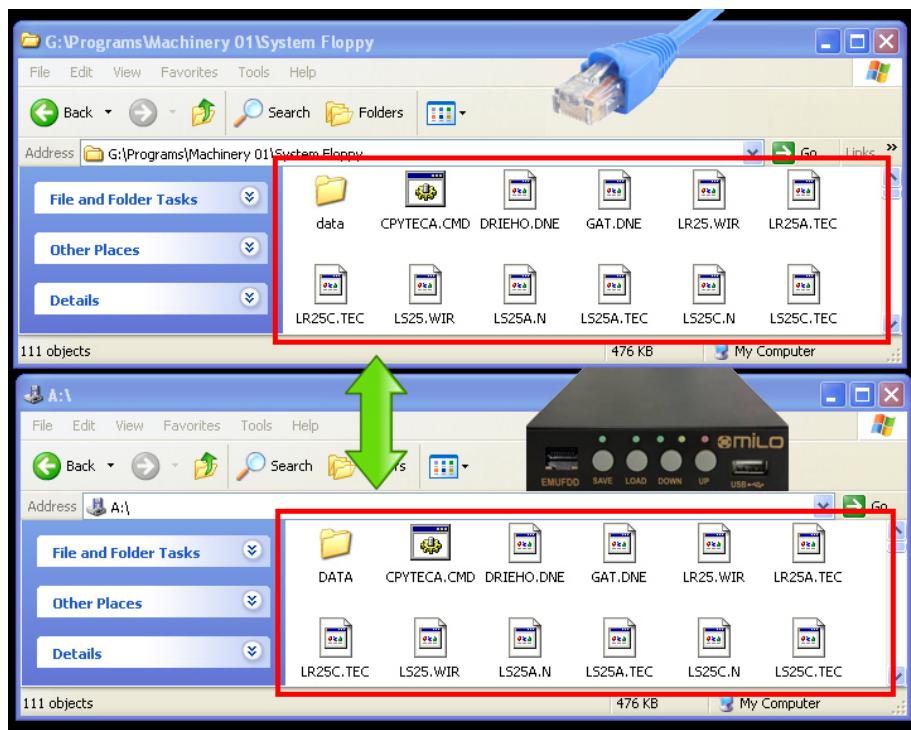
[*top window*] the PC server

[*bottom window*] EMUFDD (A:) in the machinery



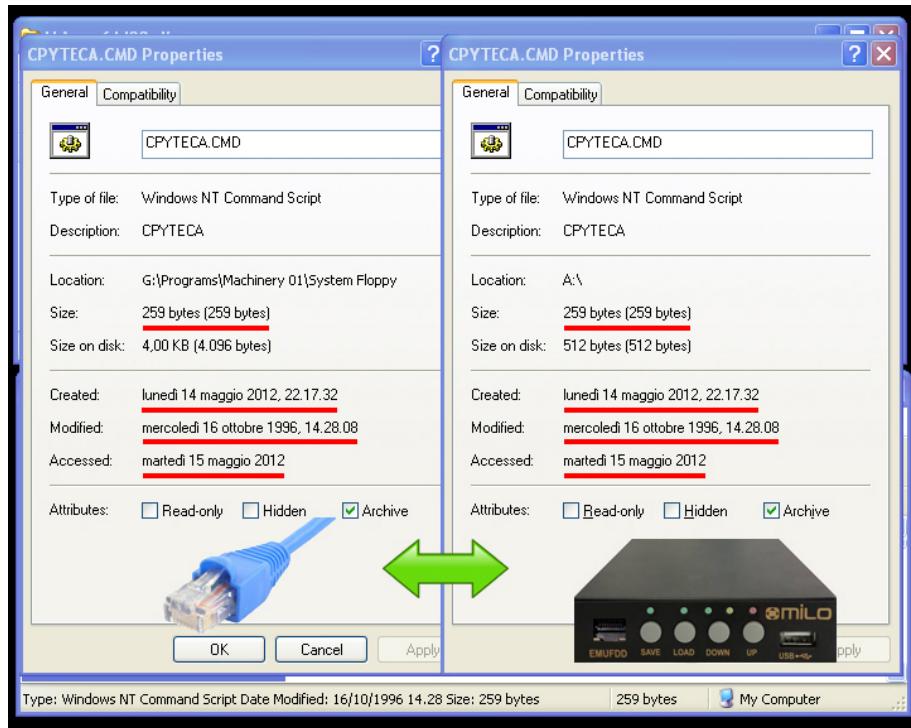
[*top window*] the PC server

[*bottom window*] EMUFDD (A:) in the machinery



[*top window*] the PC server

[*bottom window*] EMUFDD (A:) in the machinery



[*top window*] the PC server

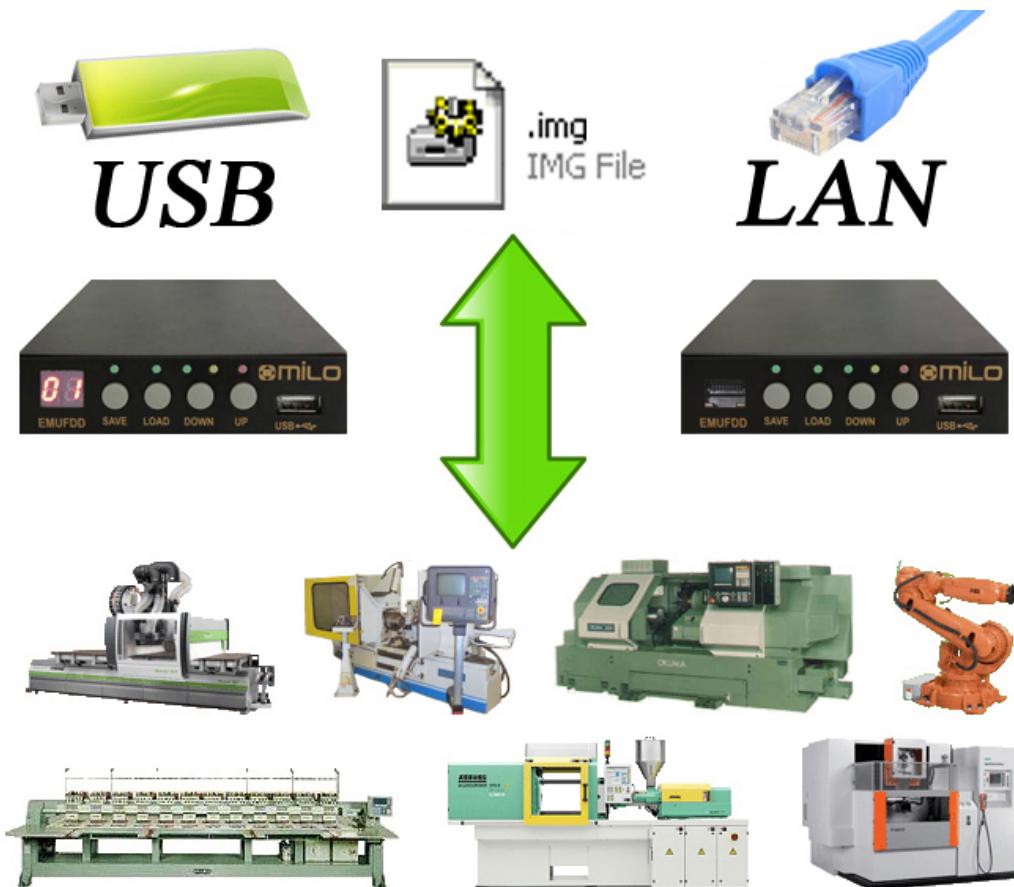
[*bottom window*] EMUFDD (A:) in the machinery

A diff between the original **disk#00** in the PC server (...\\System Floppy\\cpyteca.cmd) and its “translated” version by EMUFDD (A:\\cpyteca.cmd) shows that there's no high-level difference in the directory structure and the attributes of each file:

Name / Size / Creation time / Modify time / Access time

Section 7. VIRTUAL-FLOPPY MODE STORAGE

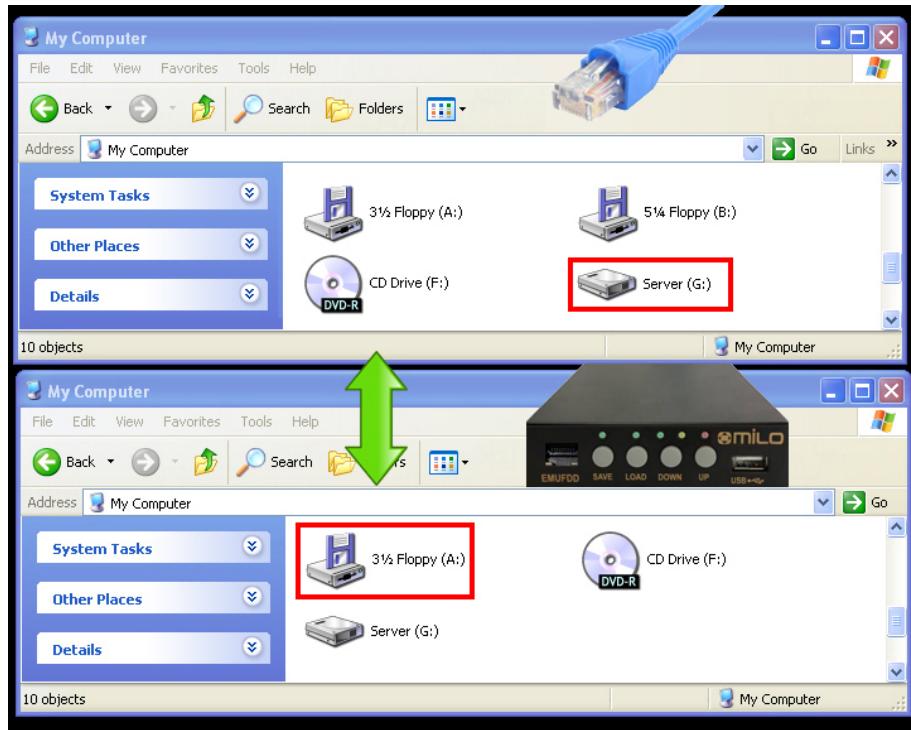
Data can be loaded/saved into/from EMUFDD's memory using the network software. No special partitioning is needed to access and copy'n'paste all the floppy disks. The virtual-floppy mode, a.k.a. "[ISO FLOPPY IMAGE FILES](#)", reads/saves all the floppy disks from/to image files on the PC server (mounted using free software VFD) and each ".img" file will be handled as the low-level snapshot of a different floppy disk:



PC	\leftrightarrow	EMUFDD
...\\example_floppy.img	\leftrightarrow	<floppy> track0/side0/sector1
	\leftrightarrow	<floppy> track0/side0/sector2
	...	

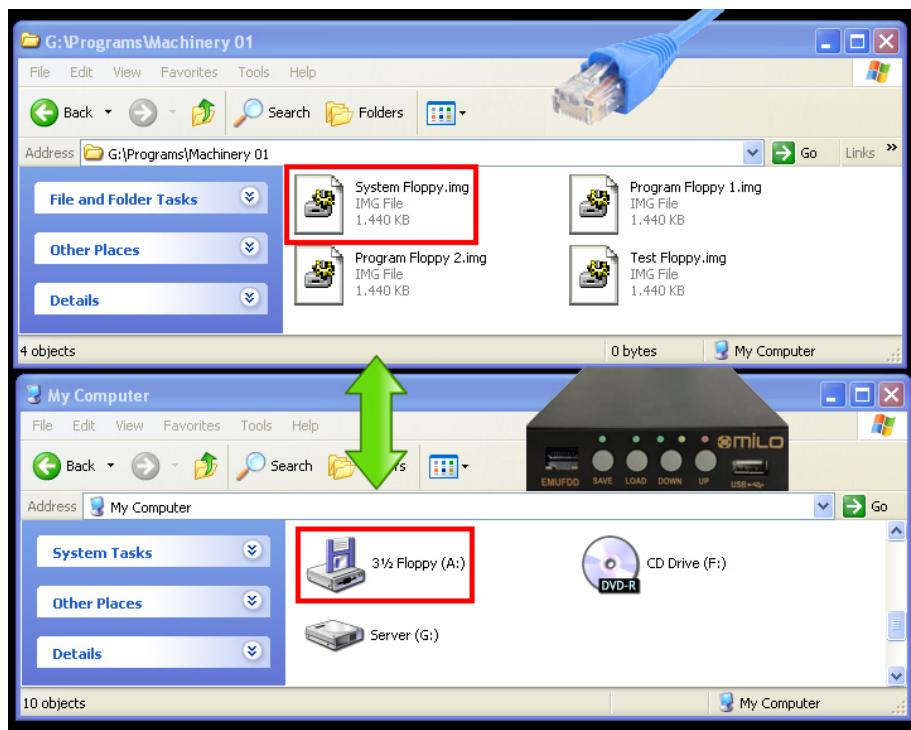
Virtual-Floppy image files:

- are available for both loading and saving;
- are a low-level snapshot of the floppy disk surface;
- allow unlimited emulation of any floppy disk (system, bootable, custom, ...);
- can be directly mounted as virtual floppy drives by free software VFD;
- can be directly imported as backups of real floppies by free software OmniFlop.



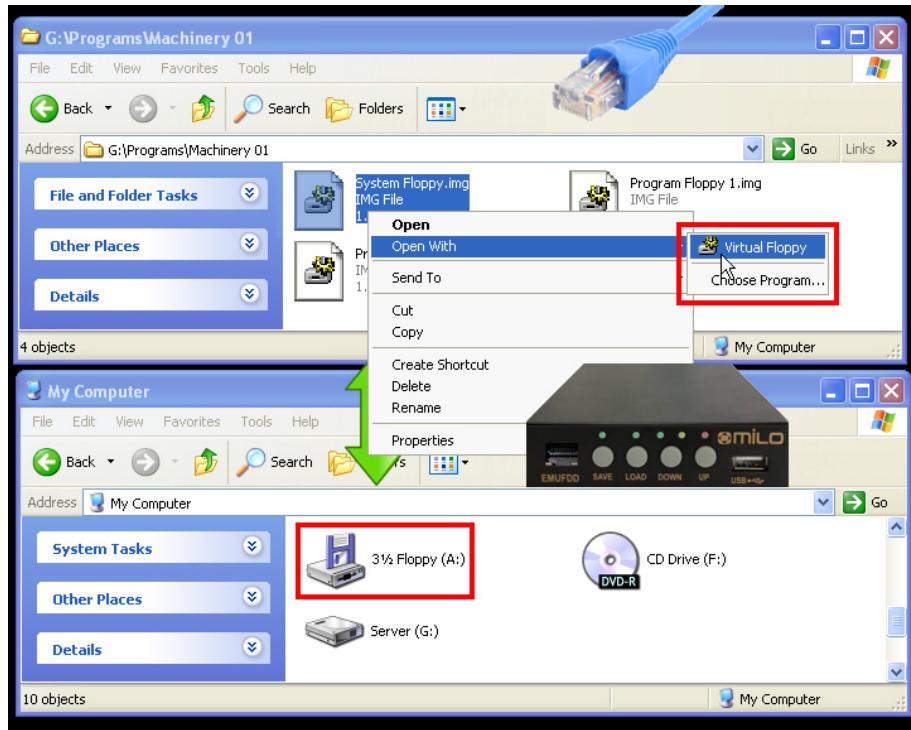
[*top window*] the PC server

[*bottom window*] EMUFDD (A:) in the machinery



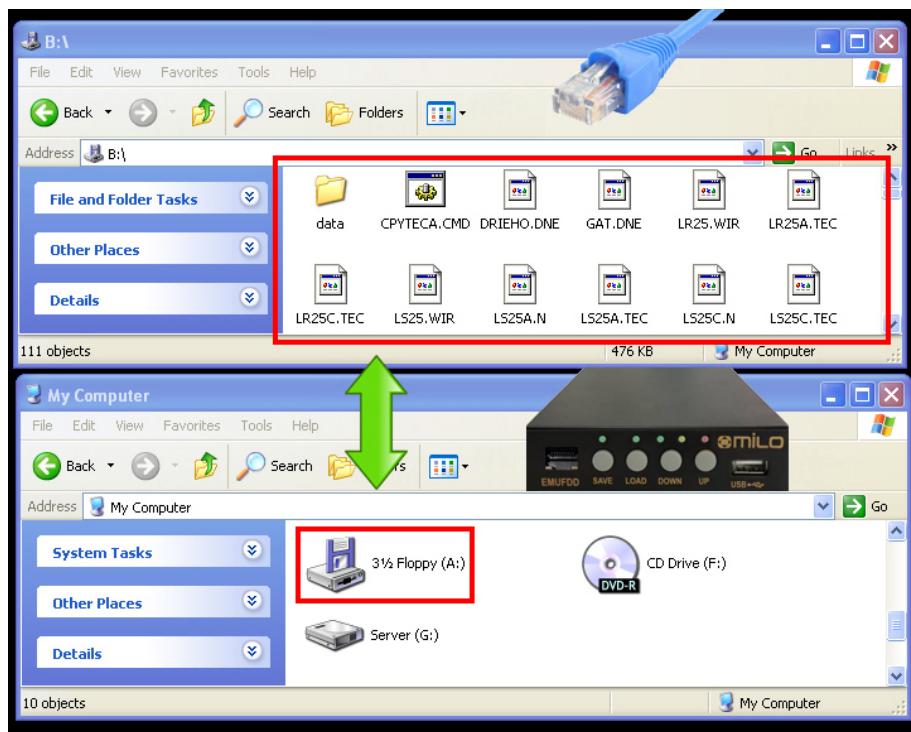
[*top window*] the PC server

[*bottom window*] EMUFDD (A:) in the machinery



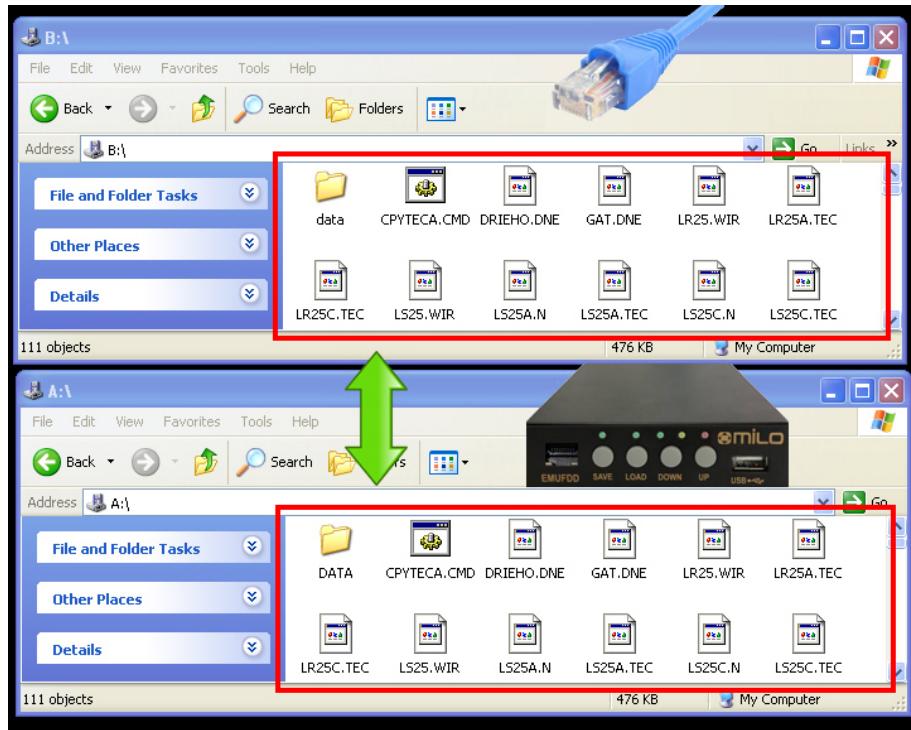
[top window] the PC server

[bottom window] EMUFDD (A:) in the machinery

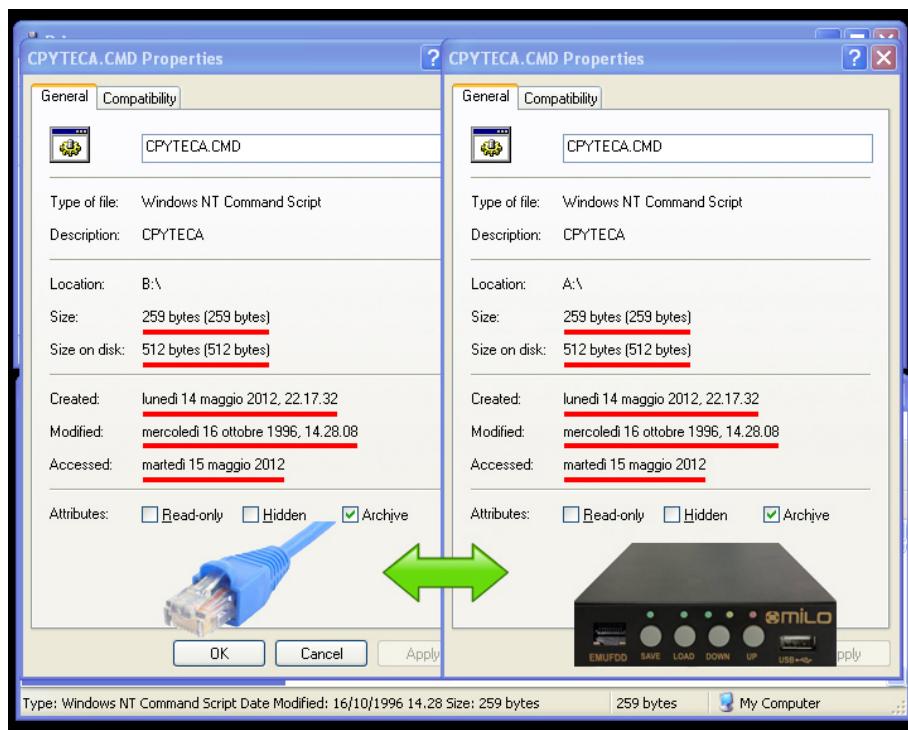


[top window] VFD (B:) in the PC server

[bottom window] EMUFDD (A:) in the machinery



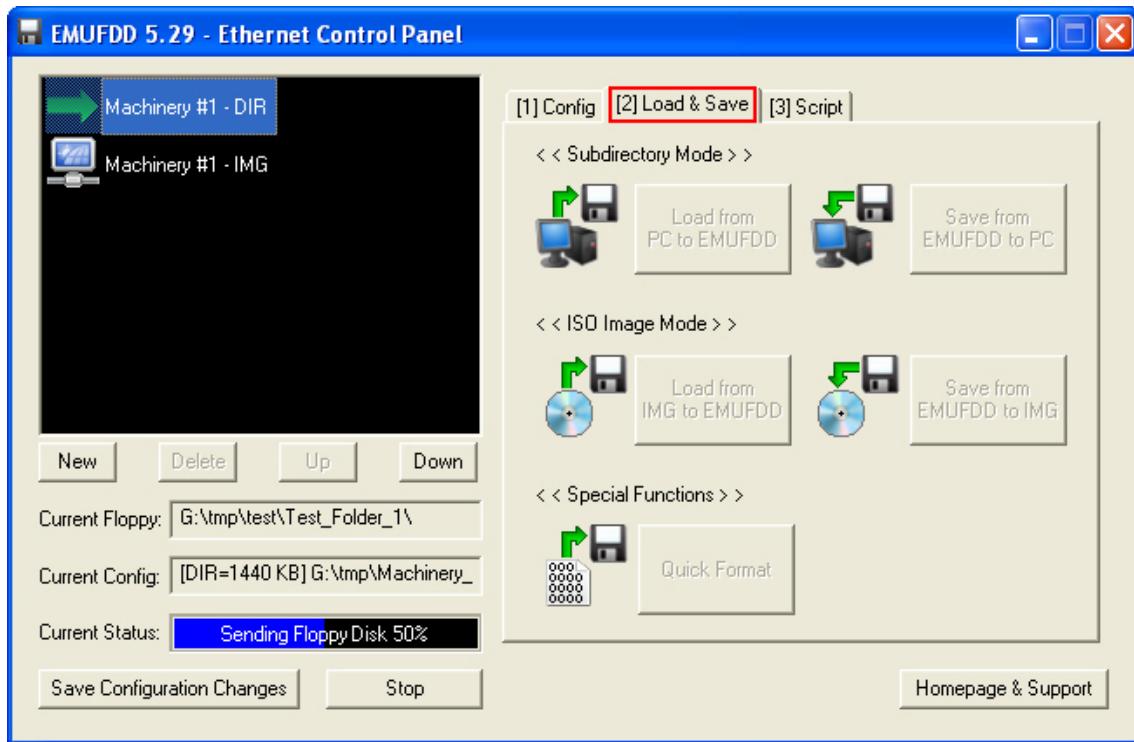
[top window] VFD (B:) in the PC server
 [bottom window] EMUFDD (A:) in the machinery



A diff between the original **disk#00** in the PC server (B:\cpyteca.cmd) and its “translated” version by EMUFDD (A:\cpyteca.cmd) shows that there's no high-level and low-level difference in the directory structure and the attributes of each file:

Name / Size / Size on disk / Creation time / Modify time / Access time

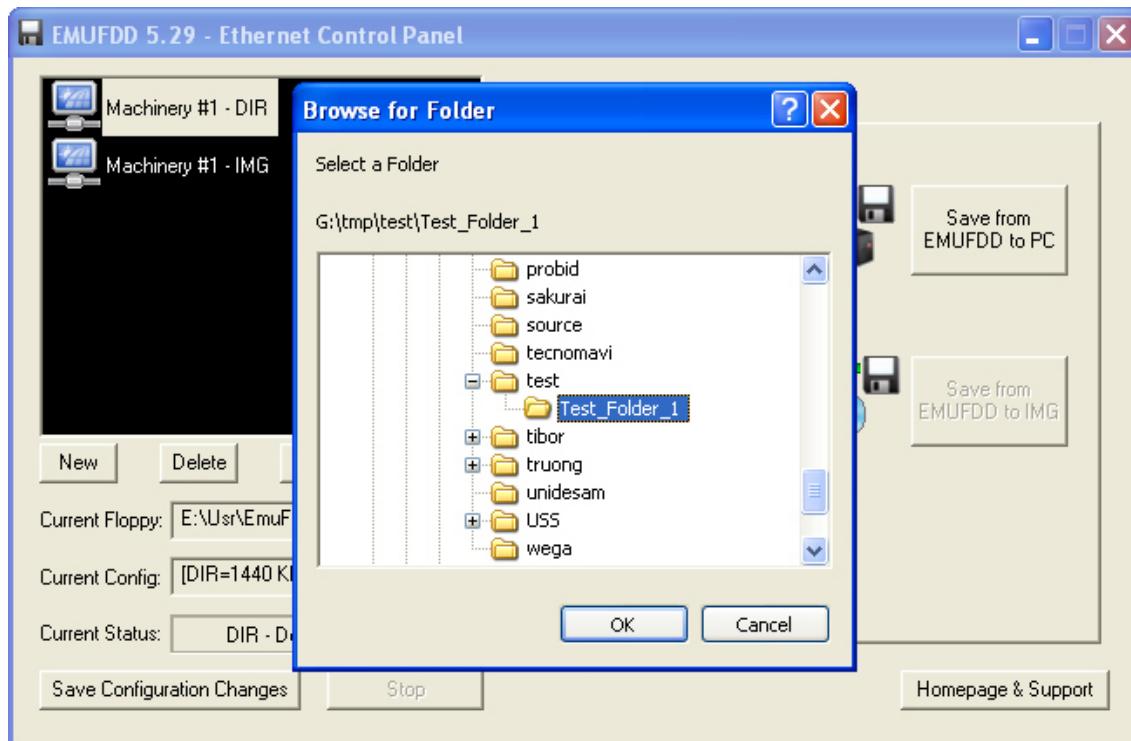
Section 8. LOADING INTO EMUFDD'S MEMORY FROM PC SERVER



- Select a **CONFIGURED CONNECTION**;
- Go to the **[2] Load & Save** right panel;
- Click **Load from PC to EMUFDD** and select a subdirectory (softwareless mode) or **Load from IMG to EMUFDD** and select a .img file (virtual-floppy mode) that you want to send to the machinery. **Quick Format** is available only in softwareless mode;
- The software will immediately start the network connection, if (1) the IP address is not being used by another connection and (2) the source is not being written by another connection;
- The icon, during the connection, will change. If the connection is hanging up, you can stop it at any moment clicking **Stop**.

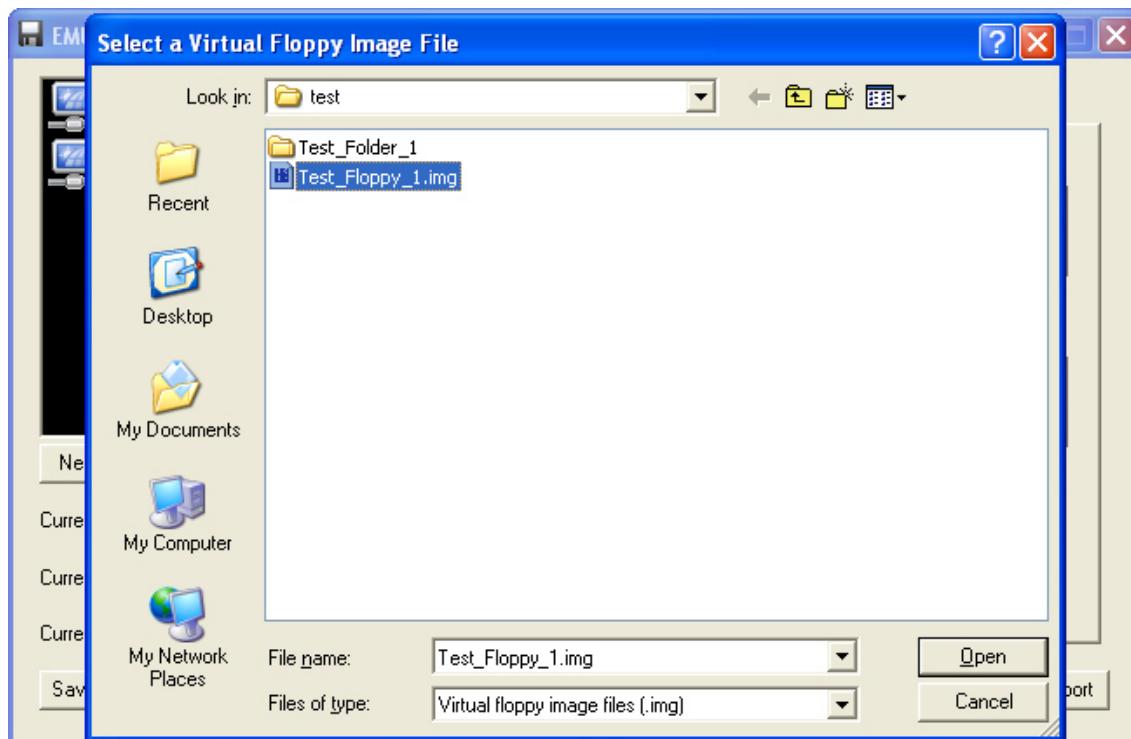


**Loading completely overwrites EMUFDD's internal memory.
The previous floppy, if not backed up before, can't be recovered !**



*Example 1: **SOFTWARELESS MODE STORAGE***

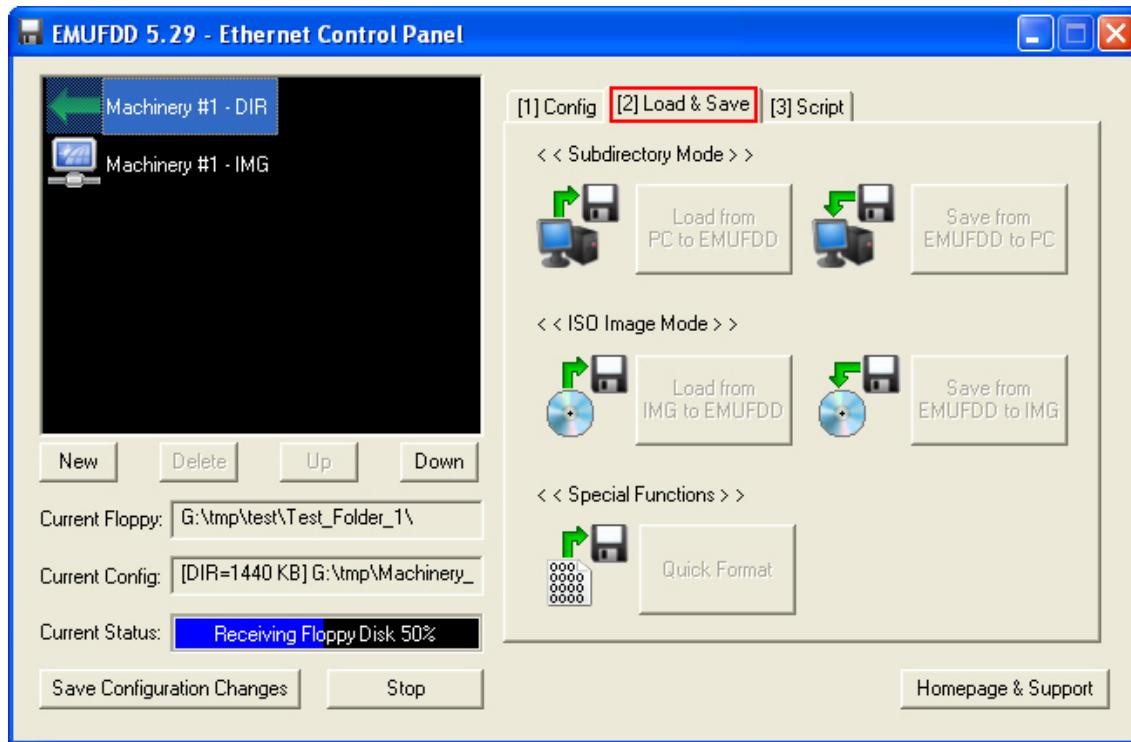
Loading from "...\\Test_Folder_1\\""



*Example 2: **VIRTUAL-FLOPPY MODE STORAGE***

Loading from "...\\Test_Floppy_1.img"

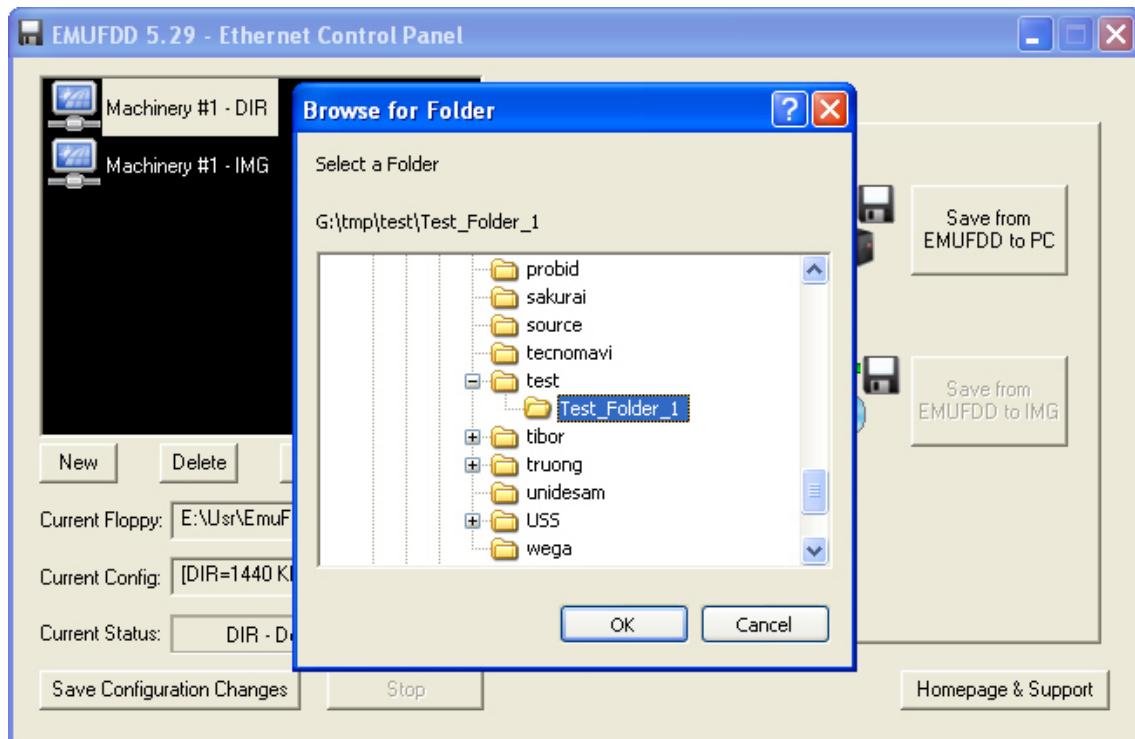
Section 9. SAVING FROM EMUFDD'S MEMORY TO PC SERVER



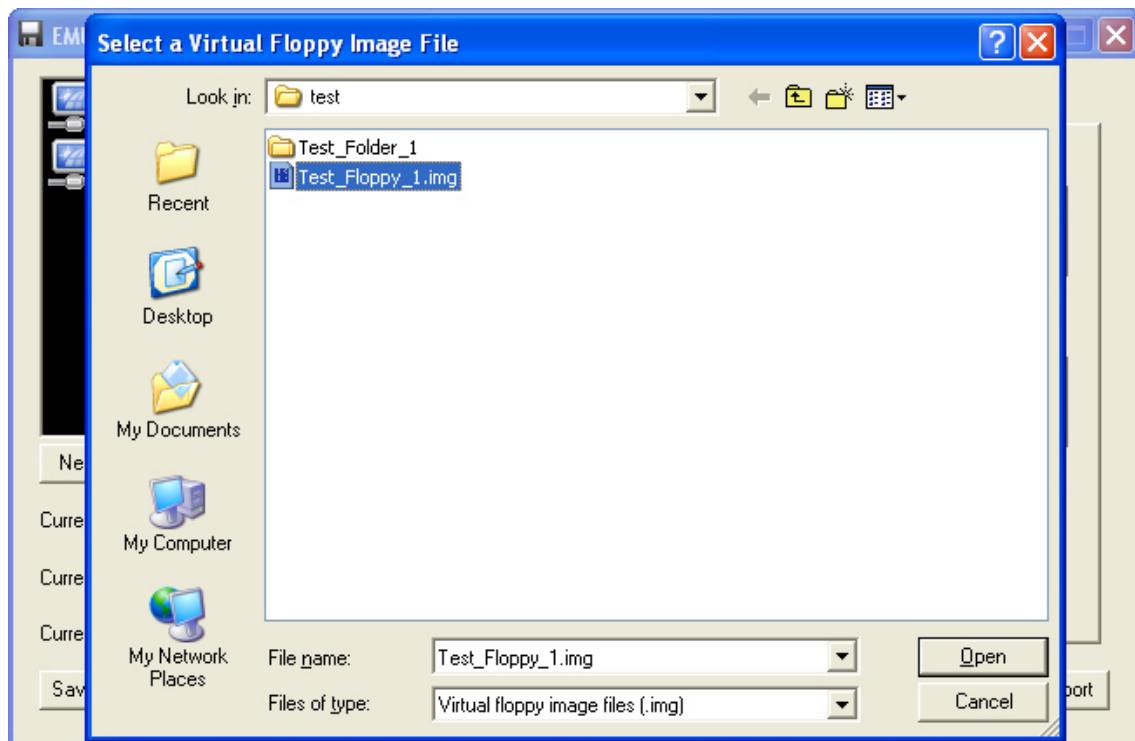
- Select a CONFIGURED CONNECTION;
- Go to the [2] Load & Save right panel;
- Click Save from EMUFDD to PC and select/create a subdirectory (softwareless mode) or Save from EMUFDD to IMG and select a .img file (virtual-floppy mode) that you want to receive from the machinery;
- The software will immediately start the network connection, if (1) the IP address is not being used by another connection and (2) the destination is not being read/written by another connection;
- The icon, during the connection, will change. If the connection is hanging up, you can stop it at any moment clicking Stop.



**Saving completely overwrites PC server's destination.
The previous floppy, if not backed up before, can't be recovered !**



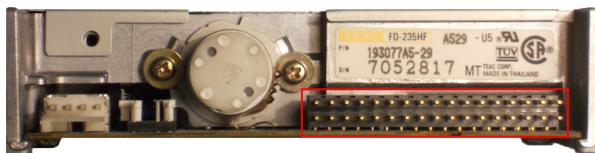
*Example 1: **SOFTWARELESS MODE STORAGE**
Saving to “...\\Test_Folder_1\\”*



*Example 2: **VIRTUAL-FLOPPY MODE STORAGE**
Saving to “...\\Test_Floppy_1.img”*

Appendix A.

SUPPORTED FLOPPY DISK DRIVE INTERFACES



34pin 3.5" floppy: Supported



50pin SCSI floppy: Supported



26pin floppy: Supported



26pin slim floppy: Supported



5.25" & 8" floppy: Supported



USB 1.0 floppy: Supported

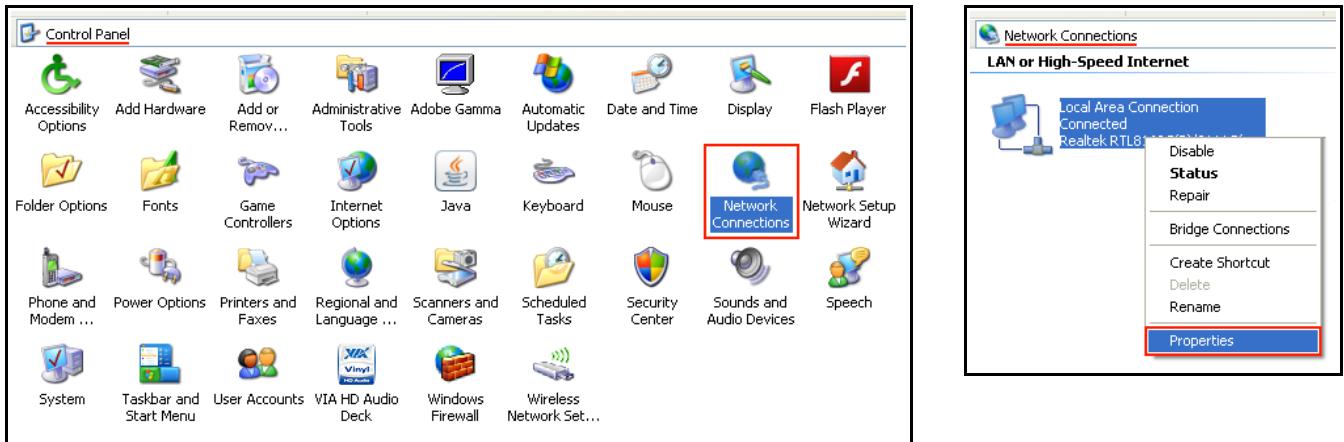
The bullet-proof EMUFDD emulation is available on all the known floppy disk drive interfaces, from the oldest ones to the most modern ones. Supported interfaces are emulated with a wide portfolio of solutions: (1) being natively supported; (2) using custom adapters manufactured by us; (3) using industry-strength standard adapters.



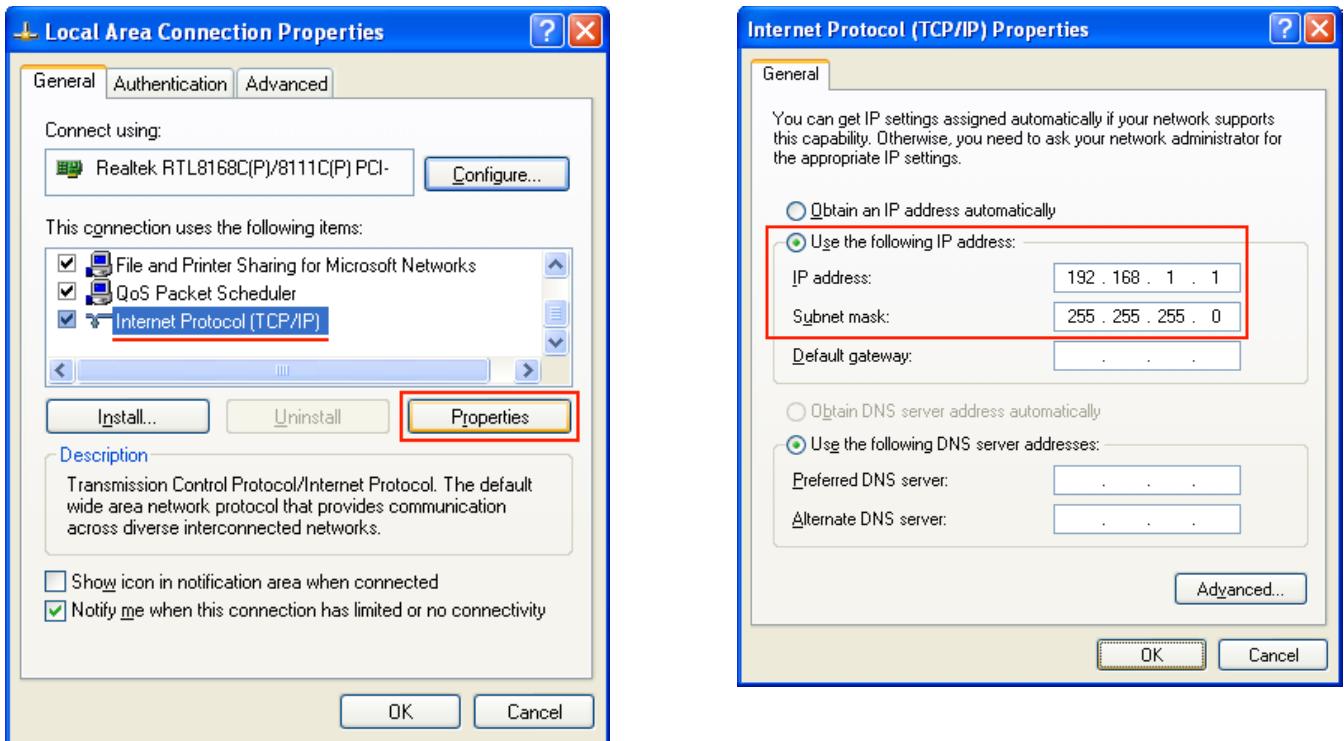
Appendix B. WINXP – GET/ASSIGN A STATIC IP ADDRESS

[Network Architecture 1] Assign a static IP address to your PC

- Open the PC “Control Panel” and select “Network Connections”. Choose your “Local Area Connection” and right-click for its properties;



- Select the “Internet Protocol (TCP/IP)”, click on its properties and assign a static IP address and the local network subnet mask.

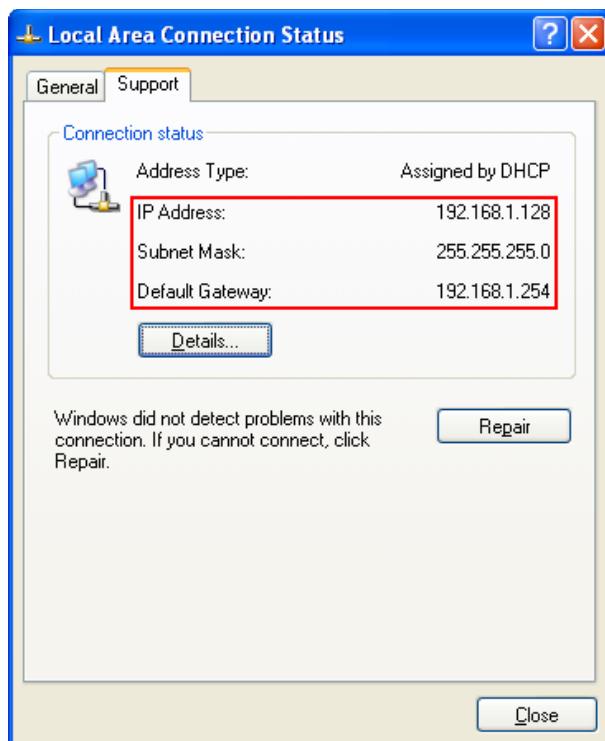


[Network Architecture 2] Get your current network configuration from DHCP

- Open the PC “Control Panel” and select “Network Connections”. Choose your “Local Area Connection” and right-click for its status;



- Select the “Support”, and get your current network configuration from DHCP. EMUFDD will be assigned same “Subnet Mask”, same “Default Gateway”, and next available “IP address” (to be reserved by you as static fixed one).

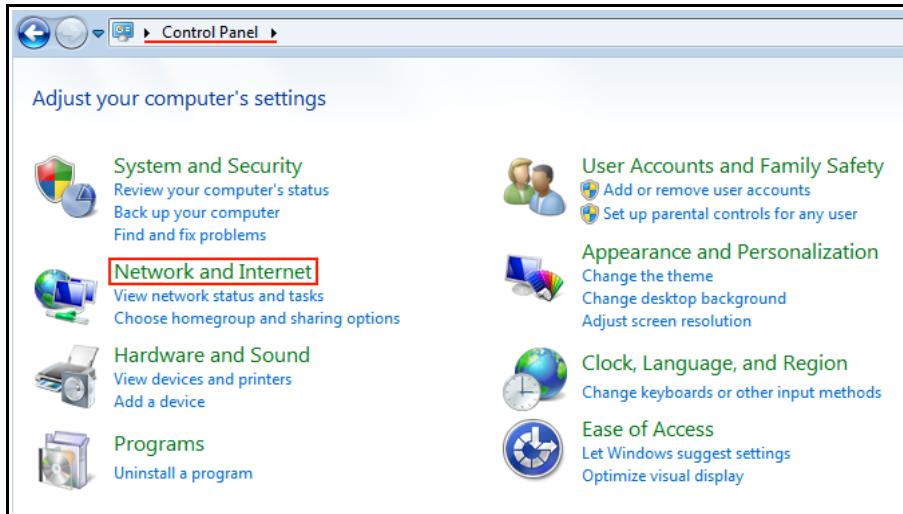


Appendix C.

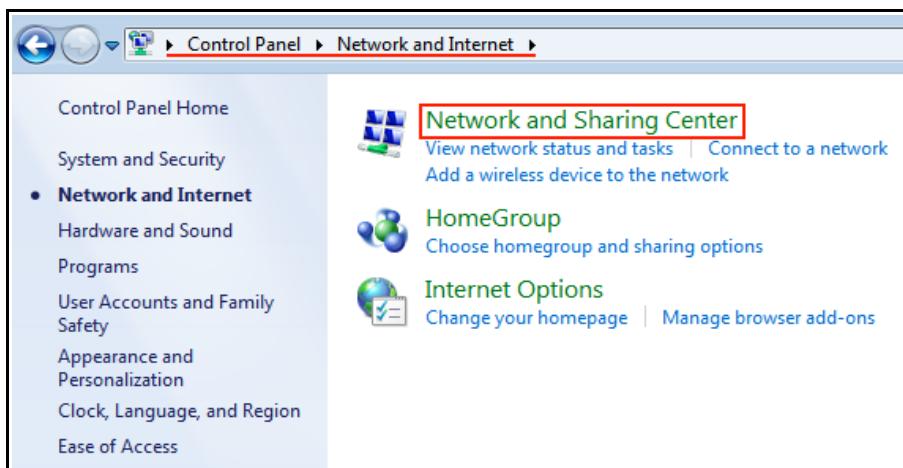
WIN7 & WIN8 – GET/ASSIGN A STATIC IP ADDRESS

[Network Architecture 1] Assign a static IP address to your PC

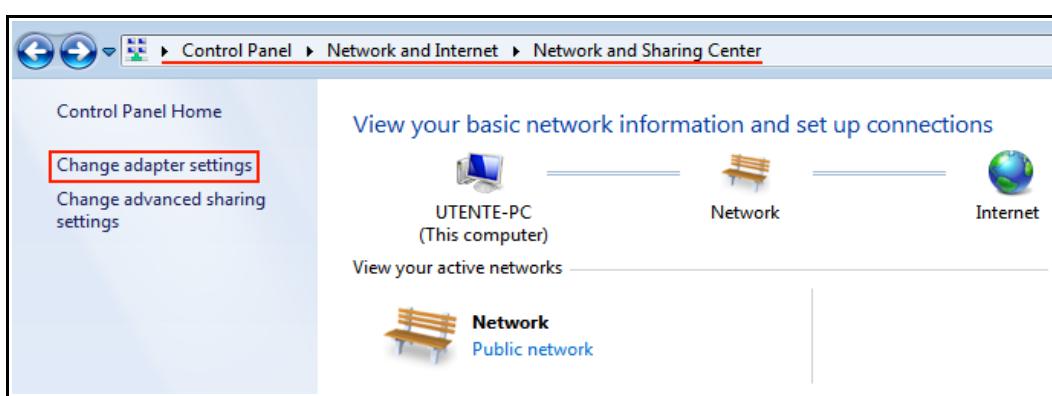
- Open the PC “Control Panel” and select “Network and Internet”;



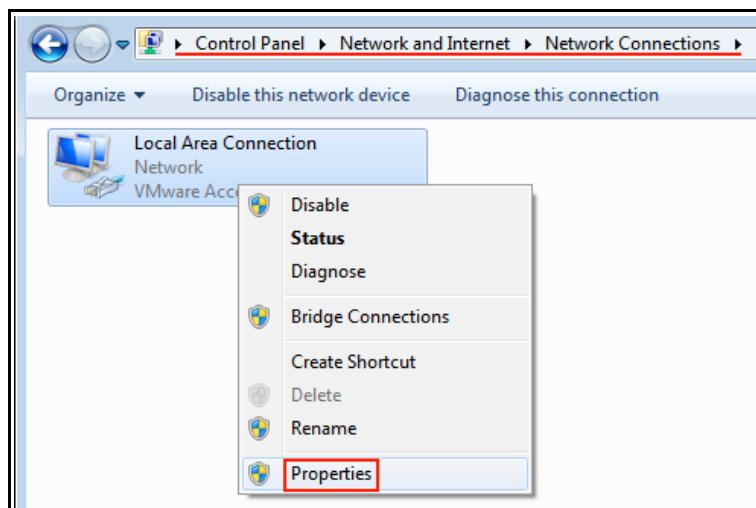
- Open the “Network and Sharing Center” subsection;



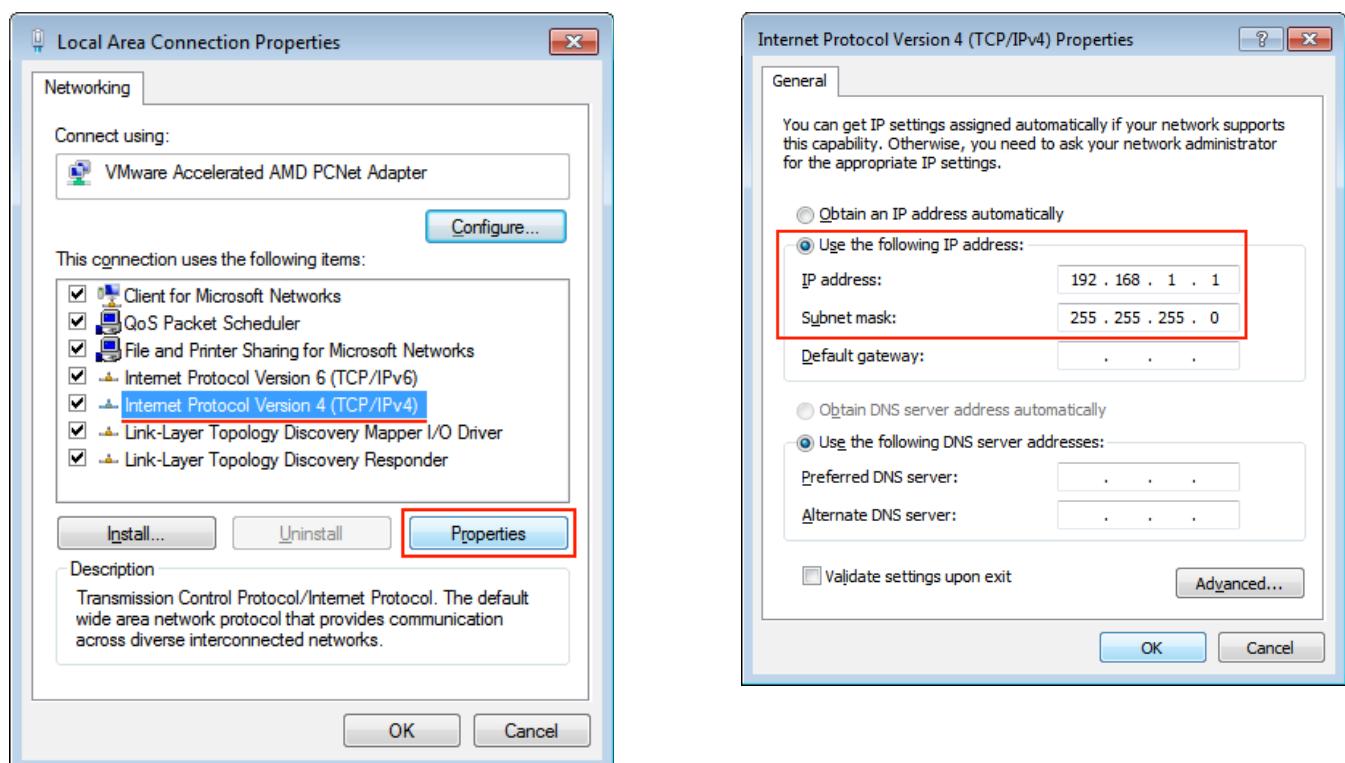
- Open the “Change adapter settings” subsection;



- Choose your “**Local Area Connection**” and right-click for its properties;

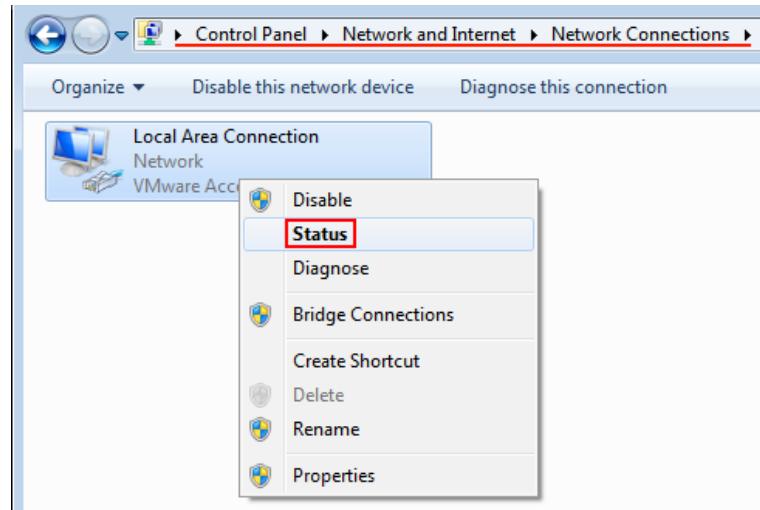


- Select the “**Internet Protocol Version 4 (TCP/IPv4)**”, click on its properties and assign a static IP address and the local network subnet mask.



[Network Architecture 2] Get your current network configuration from DHCP

- Choose your “Local Area Connection” and right-click for its status;



- Select the “Details”, and get your current network configuration from DHCP. EMUFDD will be assigned same “IPv4 Subnet Mask”, same “IPv4 Default Gateway”, and next available “IPv4 address” (to be reserved by you as static fixed one).

The image contains two side-by-side windows. The left window is titled 'Local Area Connection Status' and shows general connection information like IPv4 Connectivity (Internet), Media State (Enabled), Duration (00:09:07), and Speed (100.0 Mbps). It has a 'Details...' button highlighted with a red box. The right window is titled 'Network Connection Details' and lists various connection properties. Several properties are highlighted with red boxes: 'IPv4 Address' (192.168.1.128), 'IPv4 Subnet Mask' (255.255.255.0), 'IPv4 Default Gateway' (192.168.1.254), and 'IPv4 DHCP Server' (192.168.1.254). Other listed properties include Description (Realtek RTL8168C(P)/8111C(P) Family), Physical Address (00-22-15-E0-CE-26), Lease Obtained (lunedì 24 marzo 2014 23:34:14), Lease Expires (martedì 25 marzo 2014 00:04:38), IPv4 DNS Servers (62.101.93.101, 83.103.25.250), and IPv4 WINS Server.