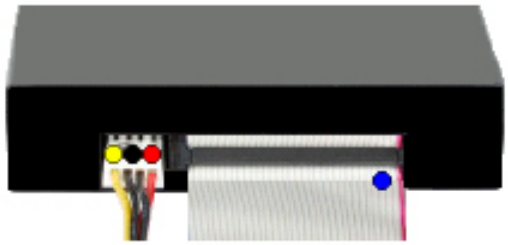
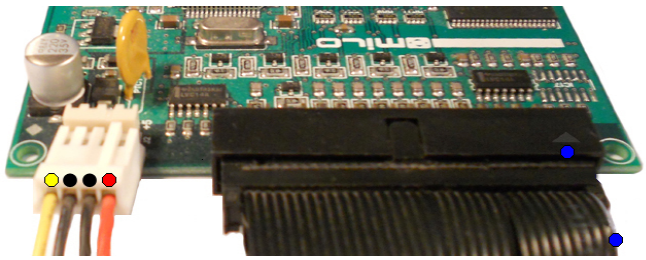
EMUFDD 4.0 – User Manual

Section 1. Hardware Installation:





EMUFDD installation works like any other real floppy drive installation:

- 1.1) connect the power supply

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

- 1.2) connect the 34pin flat cable

🔵	=	pin-1 mark (flat cable / connector)

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

[!!] Sometimes flat cables are inverted! Please check wether the cable is coloured/marked at pin-1 (standard) or pin-34 (inverted)

No system driver or additional software needs to be installed on the host system.

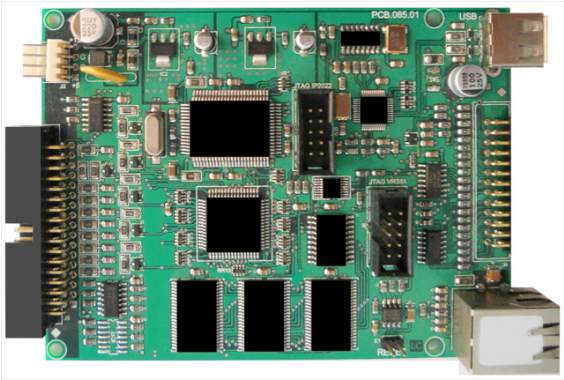
MILO S.N.C.
SW & HW per Automazione - Industrial Automation SW & HW
Via Ruggiero Grieco 1/C, 41011 Campogalliano (MO), Italy
Codice Fiscale / Fiscal Code: 03373570369 - P.IVA / VAT: 03373570369
Tel. 059/528512 - Fax. 059/520131 - Email: info@milosrl.it - Web: www.milosrl.it

Section 2. On-Line Mode / Floppy Disk Emulation:

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

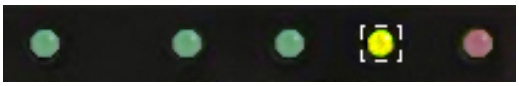
- no need to keep the USB key plugged in;
- top-quality data storage and memory reliability (10^{14} read/write cycles)

More than 50 years of non-stop read/write emulation at full speed (*1.4MB – HD*).



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: **[–]** / **[–]** / **[NN]**, where NN is the current floppy disk number, (from 00 to 99).

Snapshot of a display On-Line sequence (*NN = 01*).

Section 3. Off-Line Mode / Loading from USB into EMUFDD's Memory:

Data can be loaded into EMUFDD's memory from any USB1 / USB2 key, using:

- full Subdirectory-to-DOS-FAT12 translation; **X:\emufddNN.dir***
- standard ISO floppy images files. **X:\emufddNN.img**

If both subdirectory NN and image NN exist, image NN will be loaded.

Subdirectory-to-DOS-FAT12 translation:

USB key		**EMUFDD (floppy NN)**
X:\emufddNN.dir\dir1\file1.ext		A:\dir1\file1.ext
X:\emufddNN.dir\dir2\file2.ext		A:\dir2\file2.ext
X:\emufddNN.dir\file3.ext	⇒	A:\file3.ext
X:\emufddNN.dir\file4.ext		A:\file4.ext
...		...

- translation is available only for 720KB, 1.2MB and 1.44MB floppy disks;
- translation is available only for loading;
- filenames will be truncated to 8+3 short form (Longname.ext → longna~1.ext);
- please ask for the translation feature to be enabled at purchasing time.

Standard ISO floppy image file:

USB key		**EMUFDD (floppy NN)**
X:\emufddNN.img	⇔	floppy: track0/side0/sector1
		floppy: track0/side0/sector2
		...
		floppy: track79/side1/sector18

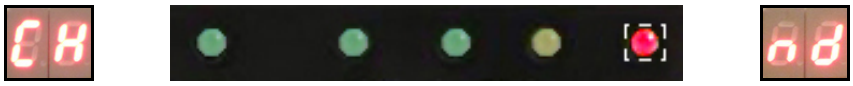
Floppy image files:

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

Step-by-step loading:

- 3.1) plug the USB key in and go Off-Line: press SAVE or LOAD;

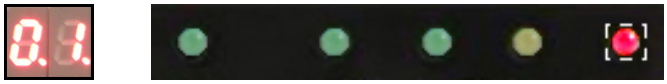
- 3.2) OFF-LINE_LED turns on and the display shows **[CH]** while *checking* the USB key for floppy image files (and subdirectories, if translation is on). Should *no USB device* be plugged in, the displays shows **[nd]** and EMUFDD switches automatically back to On-Line mode;



- 3.3) the display shows the current floppy number. Select the floppy to be loaded changing the current number (short DOWN/UP pressure = –1/+1, long DOWN/UP pressure = fast rewind/forward). Missing floppies are shown as **[NN]**, existing floppies are shown as **[N.N.]**.

  Only existing floppies can be loaded, pressing LOAD;

- 3.4) the display, while *loading*, shows **[LO]** and LOAD_LED / ACT_LED turn on, until loading end. Any loading *error* immediately stops loading and display shows **[Er]**. Successful loading ends with display showing again current floppy number and LOAD_LED / ACT_LED turned off;



[!!] Plugging the USB key off while loading will not damage the USB key but will force EMUFDD to reset with an incomplete/inconsistent internal memory.

- 3.5) being no button pressed, after 5 seconds, EMUFDD automatically switches back to On-Line mode. Feel free to plug the USB key safely off.

[!!] Loading completely/partially overwrites EMUFDD's internal memory. Previous current floppy data, if not saved before loading, can't be recovered.

Section 4. Off-Line Mode / Saving from EMUFDD's Memory into USB:

Data can be saved from EMUFDD's memory into any USB1 / USB2 key, using:

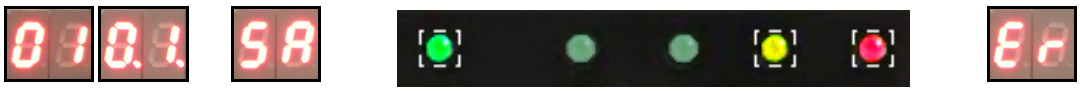
- standard ISO floppy images files. **X:\emufddNN.img**

Step-by-step saving:

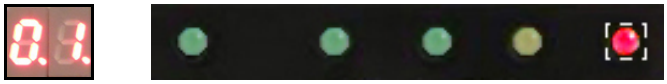
- 4.1) plug the USB key in and go Off-Line: same as (3.1 & 3.2);

- 4.2) the display shows the current floppy number. Select the floppy to be saved changing the current number (short DOWN/UP pressure = –1/+1, long DOWN/UP pressure = fast rewind/forward). Missing floppies are shown as **[NN]**, existing floppyies are shown as **[N.N.]**.

Both missing and existing floppies can be saved, pressing SAVE (missing ones are created, existing ones are overwritten);



- 4.3) the display, while *saving*, shows **[SA]** and SAVE_LED / ACT_LED turn on, until saving end. Any saving *error* immediately stops saving and display shows **[Er]**. Successful saving ends with display showing again current floppy number and SAVE_LED / ACT_LED turned off;



[!!] Plugging the USB key off while saving will damage the USB key and force EMUFDD to reset, but will not affect internal memory.

- 4.4) being no button pressed, after 5 seconds, EMUFDD automatically switches back to On-Line mode. Feel free to plug the USB key safely off.

Load + Save can be used to create, without using a PC, multiple copies of an existing floppy on the USB key. For example: load NN and save it as NN+1, NN+2, NN+3, ...

Section 5. Off-Line Mode / Formatting EMUFDD's Memory and USB:

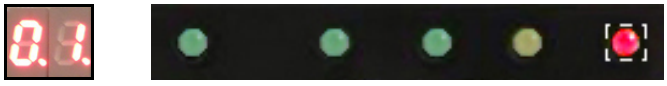
Formatting:

- is available only for 720KB, 1.2MB and 1.44MB floppy disks;
- creates an empty FAT12 floppy into internal memory and USB (current floppy).

- 5.1) plug the USB key in and go Off-Line: same as (4.1);

- 5.2) select the floppy to be formatted and press SAVE+LOAD: similar to (4.2);

- 5.3) the display, while *formatting*, shows **[FO]** and SAVE_LED / LOAD_LED / ACT_LED turn on, until formatting end. Any formatting *error* immediately stops formatting and display shows **[Er]**. Successful formatting ends with display showing again current floppy number and SAVE_LED / LOAD_LED / ACT_LED turned off;



[!!] Plugging the USB key off while formatting will damage the USB key and force EMUFDD to reset, but will not affect internal memory.

- 5.4) being no button pressed, after 5 seconds, EMUFDD automatically switches back to On-Line mode. Feel free to plug the USB key safely off.

Section 6. EMUFDD Configuration:

EMUFDD configuration is plug'n'play and absolutely jumper-free:

- 6.1) Load a valid “emufdd4.cfg” file into a USB key;

Configuration files for any machinery/floppy drive/floppy disk will be provided for free, only after purchasing, writing to the customer support (Eng. Cosimo Oliboni, 7/7 direct line with the designer of EMUFDD) at oliboni@embeddedsw.net

- 6.2) plug the USB key in and go Off-Line: same as (4.1);

- 6.3) wait until auto-reset (all leds blink very fast);

- 6.4) load a valid floppy into memory (Section 3) or, if format is supported (720KB, 1.2MB and 1.44MB floppy disks), format EMUFDD's memory (Section 5).

Appendix. EMUFDD4 Tech info:

Designer's EMUFDD tech homepage : http://embeddedsw.net
Manufacturer's EMUFDD homepage : http://milosrl.it

Floppy disk configurability: *Encoding, Rotation speed and drive geometry*.

Media
Density: FM / MFM / *...custom...*
Speed: 300rpm / 360rpm / *...custom...*
Format: 640K / 720K / 800K / 1.2M / 1.4M / *...custom...*

Floppy drive configurability: *FDC host interface*.

Pin	Dir	Signal		
2	Out	(PC) **Density Select**	(NC) **Disk Change**	(Custom) **Density Select** **Disk Change** **Ready** **0 (GND)** **1 (+5V)**
4	-	-		
6	-	-		
8	Out	Index Hole		
10	In	(PC) **MotorA**	(NC) **Drive0**	(Custom) **Pin10**
12	In	(PC) **DriveB**	(NC) **Drive1**	(Custom) **Pin12**
14	In	(PC) **DriveA**	(NC) **Drive2**	(Custom) **Pin14**
16	In	(PC) **MotorB**	(NC) **Motor**	(Custom) **Pin16**
18	In	Step Dir		
20	In	Step Pulse		
22	In	Write Data		
24	In	Write Enable		
26	Out	Track 0		
28	Out	Write Protect		
30	Out	Read Data		
32	In	Head Select		
34	Out	(PC) **Disk Change**	(NC) **Ready**	(Custom) **Disk Change** **Ready** **Density Select** **0 (GND)** **1 (+5V)**