The

COLLABORATORS			
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WRITTEN BY		February 12, 2023	

REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME

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The

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```
                        <=-------------------------------=>
             The Portable MSX2 Emulator v2.1
           <=-----------------------------=>
                 for AMIGA WorkStations.

        1994/95 © RED Soft S.L. (BARCELONA)
       Written by:   Juan Antonio Gómez Gálvez


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1.2 The Portable MSX2 Emulator.

```
    Note from the author
    --------------------

    This  is  the  last version of my MSX2 emulator.  I finally abandon this
```

hard-work project for various reasons.

    This emulator does NOT emulate 100% an MSX2, if a program doesn't work,
that is due to things that aren't fully emulated on the AMIGA because they
can't be emulated correctly:

    - Horizontal Interrupts, page swapping & vertical sprite coords.

    These features must be performed in real-time and I haven't achieved it,
although I have spent much time trying.

    MSX2 Sprites have a special Mode that permits displaying extra colors.
This can't be emulated with the AMIGA's sprites. And developing a sprites
system that would permit this would "downgrade-it" to the speed of the MSX2
emulator for PC... X^)

    If you register you should be aware of this.

    This program has deceived me, I haven't made a profit with the very few
registered versions & this is very dissapointing. It seems that PC is more
profit-making.

    And about the people that tell me I should be a Super PC coder; Take it
of your head, I don't have a PC and I don't want one either; The Operating
System & hardware are "outdated".

    To all of those that think that there aren't any AMIGAS in Spain, they
are very mistaken, there IS a scene in Spain, Partys & loads of people that
do great things with the AMIGA.

    Well, that's all, bye!

                                    Juan Antonio Gómez.
                             (Barcelona, 4 of august of 1995)

1.3   The Portable MSX2 Emulator.

    How to register:

    This program is shareware, so this is a DEMO versión.

    If you are interested in the FULL version, you must register.

    The registered version is 100% identical to this one (MSX v2.1) but it
permits emulation of two joysticks, a continue OPTION & no time-limit.

    If you want to register, you must fill-in & send me this questionaire
with 3000 Pesetas (or $30 US Dollar).

<=--=>
                         MSX2 Emulator Register:

- Full Name: _____

- Complete Address: _____

- Amiga you own: _____
<=--=>

                        -=> To register, write to:

                        Rafy Gomez Galvez
                        Apdo: 275
                        08940 Cornella de Llobregat
                        BARCELONA
                        (SPAIN)

    When I receive this, I'll send you the Emulator immediatly. All this
packed in a padded envelope with a brand new Nashua or TDK disk with version
2.1 recorded on it. (registered)

    Note: Rafy is my sister and she will be in charge of sending the
registered versions of the emulator because I won't be able to...

1.4 The Portable MSX2 Emulator.

    Introduction

    This program is ShareWare, this version can be freely spreaded as long
as you don't sell it. All files must be present:

    MSX2_v2.1   MSX2 Emulator.
    MSX2.guide   This file.
    MSX2_SP.guide   Spanish translation.
    Teclado.gif   MSX Keyboard picture.
    and .info files   Workbench icons.

    <*> What is required:

    - AMIGA computer with Motorola 68020 or better processor.
    - ROM 2.0 or newer.
    - File DEVS:mfm.device © Commodore-Amiga inc.
    - 1.8 Megs of memory approx.
    - PAL, NTSC or compatible monitor.

    - MC68040 CopyBack OFF.
    - (AGA chip set for 256 colours mode & right border colour emulation)

    (1.5 Mb Fast32bit required to get the maximum speed)
    (mfm.device can be found in Workbench disk, in DEVS: drawer)

    <*> What is required for a real MSX2 emulation:

```
    - Amiga computer (Graphic Chip OCS/ECS/AGA)
    - MC68020 at 25Mz or better.
    - 1Mb of Chip memory.
    - 2Mb of Fast32bit memory.  (NO PCMCIA)


    DISCLAIMER:
    -----------
    The author doesn't guarantee that this program emulates a full MSX2,
and accepts no responsability for loss of data derived from the use of
this software...

    Try to free as Fast32bit memory as possible before running the emulator.

    Many people asks me for a multitasking emulator.  Now you can find a MSX
emulator for Amiga running in multitaking.  It is called fMSX Emulator.
    I will never program a MSX2 Emulator in multitasking.  Sorry!
```

1.5   The Portable MSX2 Emulator.

```
                           <=------------------------------=>
                    The Portable MSX2 Emulator v2.1
                 <=------------------------------=>
                        for AMIGA WorkStations.

                  1994/95 © RED Soft S.L. (BARCELONA)
                 Written by:   Juan Antonio Gómez Gálvez

                          MSX2 Emulation
                        <=----------------=>

             MSX2 Proccesor Emulation

             MSX2 Display Emulation

             MSX2 Sound Emulation

             MSX2 JoyStick Emulation

             MSX2 Keyboard Emulation

             MSX2 Disk Emulation

             MSX2 Another Emulations

             Bugs and incompability.
```

1.6   The Portable MSX2 Emulator.

```
                    The Portable MSX2 Emulator
                 <=--------------------------=>
```

```
                    Main Program and emulation systems by:
                    --=>  Juan Antonio Gómez Gálvez  <=--

                         PSG Emulation and testing:
                         --=>  Sergi Martínez  <=--

                    Z-80A Secret instructions infos:
                    --=>  Antonio J. Pomar Rosselló  <=--

                         MSX Disk-Drivers infos:
                        --=>  Albert Siersema  <=--
                        --=>  Ronald Gorter  <=--

                           Technical support:
                        --=>  Manuel Hiniesta  <=--
                        --=>  Sergi  Martínez  <=--
                      --=>  Roderick Mouthaan  <=--

                         Konami's SCC chip infos:
                        --=>  Alberto Orante  <=--

                            Special Thanks to:
                          --=>  Joan Sola  <=--
                         --=>  Ramón Ribas  <=--
                        --=>  Nestor  Soriano  <=--
```

1.7 The Portable MSX2 Emulator.

```
    Instructions:
    -------------

    <*> Save Prefs:
    ---------------

    Save MSX2 Emulator preferences in S:MSX2emulator.prefs


    JoyStick 2 ON.
    --------------

    This is to determine if MSX's port 2 is emulated or not.  This port is
emulated in Amiga's mouse port, and many games would think a joystick is
connected and would read illogical values.  Activate this gadget only when
you are going to use 2 joysticks.

    When this option is enable MSX mouse is not emulated.

            (JoySticks emulated in registered versions only)


    Multi-Key mode.
    ---------------

    There  is  a  bug in Amiga 1200 keyboard, and some keys can't be pressed
```

together.   To solve this, you can active this menu and then press all keys
you want separately. MSX rom will think that you are pressing all keys at
the same time until you disables this menu.

    DEL for Pause.

    Amiga's DEL key will be pause the emulation if this menu is enable.
    To exit of pause press DEL key again.

    Ask for GO.

    If this menu is enable ask for start the emulation when click GO.

    <*> Disk Drivers:

    With this gadgets you select which Amiga-diskdrives will be used to
emulate MSX drives A: and B: . If both A: and B: drives are OFF, MSX Disk
Basic ROM will not be emulated.

    <*> MSX Boot:

    This gadget installs MSX's boot-block on the disk at DF0. You should do
this if the disk is formated in a PC or using PCx: .

    <*> VDP Options:

    - "Screen" selects display mode.

        * (MSX Mode) MSX will select NTSC or PAL when required.
        * (WB mode) MSX won't be able to exchange display mode.
        * PAL (50 Hz) The emulator will always run in PAL mode.
        * NTSC (60 Hz) The emulator will always run in NTSC mode.

    - "Inter" is to determine how many interruptions will be generated per
second. In a real MSX, this value is 50 vblanks.

    - "Re-Int":   A lot of games used re-interruptions, and due to this I
could make a lot better emulation. If your Amiga has enough speed, put it
at 50 vblanks, but if you own a slow Amiga put it at 10 vblanks and some
games will speed up.

    <*> Emulation Speed:

    If a game works too fast just put this slider to a lower value.

```
<*> Other Gadgets:
------------------

- About:  Some credits about this great program!
  -----
- Go: Makes an MSX's hard reset.
  --
- Continue:  To continue the emulation when you pressed Help.
  --------
- Exit:  To quit this great program!
  ----
```

1.8 The Portable MSX2 Emulator.

```
<*>  Z-80A  (Processor)   Emulated at a 98%
----------------------
All works correctly except this:

- Flags N and H are not emulated.
- SP register can write in ROM!
- Flag P is only emulated at instructions OR, AND, XOR.
- R register not emulated well.
```

1.9 The Portable MSX2 Emulator.

```
<*>  VDP  (Graphics chip)
-------------------------

  Emulated at a 80%

* Sprites:
----------
  - AMPLIATED sprites are not emulated.
  - 8 sprites per line are supported instead of 4 in MSX1 modes.
  - MSX2 sprites colour not emulated well.

        (Amiga's Sprits cannot emulate MSX2 overlayed sprits)

* Text modes:
------------
  - TEXT1 mode (scr 0  width < 41) 100% emulated.
  - TEXT2 mode (scr 0  width > 40) 100% emulated.
  - MULTI mode (screen 3) not emulated. Why? Nobody used it...
  - GRAPH 1 & 2 (scr 1 & 2) 100% emulated.

* Graphic modes:
---------------
  - GRAPH 3 (scr 4) not emulated (will be emulated GRAPH 2 mode (scr 2)
  - GRAPH 4 & 6 modes (scr 5 & 7) 100% emulated.
  - GRAPH 5 (scr 6) emulated with no sprites.
```

```
        - GRAPH mode 7 (scr 8):
           - AGA Chipset: 100% emulated with no sprites.
           - ECS/OCS: Emulated on 32 colors, 1 bit per RGB is lost.


    * VDP Registers:
     ---------------
        - Starting screen line emulated. (hardware scroll), but it only works
once per frame.
        - Palette registers emulated
        - Emulated Writing and Reading from registers in indirect mode.
        - Horizontal interrupt emulated as vertical.
        - Adjust register not emulated.
        - Lace mode not emulated, neither are the rest of registers...


    * VDP Commands:
     --------------
        - Logical operators:
        --------------------
        Correctly emulated.

        - Logical operators commands:
        -----------------------------
        Correctly emulated.


    * Status registers:
     ------------------
         - Only emulated 0,1 and 2 registers.
         - Not emulated the rest upto 9 register.
```

1.10 The Portable MSX2 Emulator.

```
    <*>  PSG  (Sound Chip)   Emulated at a 99%
    ---------------------
    It works correctly except waves.


    <*>  SCC  (Sound Creator)   Emulated at 98%.
    ------------------------
    Amiga cannot emulate it correctly:

    -  SCC  chip  have 5 channels and Amiga only 4, when it uses 5 channels,
channel 5 will not emulated.

    <*>  SCC+ (Sound Creator)   Emulated at 98%.
    -------------------------
    Equal than SCC.
```

1.11 The Portable MSX2 Emulator.

```
    <*>  Joystick ports.
    -------------------
```

Two firebuttons in MSX are supported. Left Amiga and Right Amiga keys
work like joystick second firebutton.

A Joypad can be used.

Amiga firebutton 1 = MSX firebutton 1
Amiga firebutton 2 & 3 = MSX firebutton 2

Amiga A port = MSX B port
Amiga B port = MSX A port

            (JoySticks emulated in registered versions only)

<*> Mouse.

MSX mouse is emulated in port A of MSX when Joystick 2 menu is disabled.

Amiga mouse need be connected in port A of Amiga.

1.12 The Portable MSX2 Emulator.

<*> Keyboard.   Emulated at a 99%

MSX keyboard is the same than Amiga's except the following keys:
(English keymap only)

                    AMIGA   MSX
                   -------   -----
                      F6   SELECT
                      F7   STOP
                      F8   HOME/CLS
                      F9   INS
                     F10   DEL
                Left ALT   GRAPH
               Right ALT   CODE

                     DEL   MSX DEL or MSX Pause (optional)
                     ç Ç   Dead key. (accents)
                     < >   Caps Lock.

              Left Amiga   JoyStick 1 - 2nd firebutton
             Right Amiga   JoyStick 2 - 2nd firebutton

        CTRL+Left ALT+DEL   MSX Reset
       CTRL+Left ALT+HELP   MSX Hard Reset

                    HELP   Go to Workbench's menu. (Exit)

1.13 The Portable MSX2 Emulator.

```
<*>  Disk drive.  Emulated at a 99%
---------------
```

Double sided and single sided MSX disks are supported. (2DD and 1DD)

Make sure your disks have got a MSX boot to avoid a hang up when the MSX is booting from a disk drive. You can install it in menu, using "MSX Boot" gadget.
   DO NOT INSTALL ALL DISKS you get, because some MSX disks had their own boot to run the game. Install only disks that you've formatted in a PC or using PCx: drives.

   To emulate MSX disk drives I have had to "kill" the interrupt that warns the Amiga that a disk has been changed, so when you exit the emulator the diskdrive will not recognise Amiga disks. I am sorry.

   It is better not to mount neither PCx nor DSx from Workbench.

   When PCx is mounted MSX2 Emulator cannot read MSX 1DD disk.

   If you insert a disk and it don't read then exit to menu window and press continue, the disk will read again.

1.14   The Portable MSX2 Emulator.

```
<*>  Memory.
------------
```
You can emulate from 128 to 4096Kb RAM amd 128Kb VRAM.

   Sub-Slots (&HFFFF) are not supported, so there are NO COMPATIBILITY PROBLEMS with Sony or Philips memory models!

   If you get a "out of memory" error, try to disable drive B: emulation.

```
<*>  Clock Battery
------------------
```
Correctly emulated except the time! (¿?)

```
<*>  Printer port.
------------------
```
   Not emulated. (I haven't got a printer, and I can't make an emulation without it!)

1.15   The Portable MSX2 Emulator.

```
   Technical Data:
   ---------------
```

   The basis of this emulator have been taken from my first MSX1 emulator (256Kb version)

The emulator has been programmed using assembler, on an A1200 with
Blizzard 1220 (MC68020 28Mhz 4Mb Fast32bit)

In order to make the emulation as fast as possible, this program
disables multitasking and it is programmed using Amiga hardware (all but the
menu and diskdrive, of course!)

To test the emulator, I used a Philips NMS-8280 MSX2 from my friend
Manuel Hiniesta.

```
<*> Slots configuration on emulated MSX2:
------------------------------------------
* Slot 0: ROM
  - Page 0: MSX2 ROM Bios.
  - Page 1: MSX-Basic ROM.
* Slot 1: Cartdridge slot 1.
* Slot 2: Cartdridge slot 2.
  - Page 0: MSX-Basic Sub-ROM.
  - Page 1: MSX Disk-Basic ROM.
* Slot 3: Memory mapped RAM (without sub-slots).
```

```
<*> Z-80A Emulation speed:   (\ensuremath{\pm}5%)
--------------------------
Routine in MSX-Basic:
```

    Time=0:For I=0 to 10000:Next:Print Time

Equipo	Time	%	
MSX2 Philips NMS-8280	864	100%	
Amiga 1200/20 No Fast.	2160	40%	
Amiga 1200/20 PCMCIA.			
Amiga 1200/20 14Mz.			
Amiga 1200/20 28Mz.	587	147%	Blizzard 1220
Amiga 1200/30 28Mz.	552	156%	Vipper 030
Amiga 1200/30 40Mz.	464	186%	
Amiga 1200/30 50Mz.	375	230%	Blizzard 1230
Amiga 2000/20 28Mz.			
Amiga 3000/30 25Mz.			
Amiga 4000/30 25Mz.			
Amiga 4000/30 33Mz.	514	168%	(acelerated)
Amiga 4000/40 25Mz.	323	267%	

1.16 The Portable MSX2 Emulator.

```
Errors, compatibility, etc...
-----------------------------
```

A MSX2 emulator cannot emulate all thinks, some MSX2 hardware things are
very hard of emulate. Sorry.

MSX computer, just like PC incompatibles, were manufactured by a lot of
companies, and not all MSX were identical each other. Well, some bad

programmed games does not take care of theese possible differences and they
only work in certain machines. MSX emulator tries to emulate the most
extended MSX computer configuration, but some programs will still fail.

    Some games fail due to emulation speed is slower than MSX speed. These
games would fail in a MSX slower than the standard. If it happens, try
setting "Re-Int" gadget in menu to a lower value.

1.17 The Portable MSX2 Emulator.

    History...

    The basics of this emulator were taken from my first MSX1 emulator.
From it, I developed the following versions:

    MSX2 Emulator v1.7:   (February'95)

    - Poor emulation of graphic modes 4 & 6 (screen 5 & 7)
    - Poor emulation of VDP copy function
    - 128Kb VRAM emulation
    - Uses MSX1 ROM.

    MSX2 Emulator v1.8: (March'95)

    - 80 columns text mode emulated.
    - Full emulation of GRAPH 4 & 6 modes (scr 5 & 7) without sprites.
    - VDP copy mode emulated.
    - Clock Battery emulated.
    - Single sided disks emulation done.
    - Interrupt mode 2 correctly emulated.
    - Uses MSX2 ROM.

    MSX2 Emulator v1.9: (April'95)

    - Palette emulation in MSX1 modes.
    - Re-programming emulation of GRAPH 4 & 6 (scr 5 & 7) modes.
    - GRAPH 5 & 7 (scr 6 & 8) modes emulated.
    - Flash emulation in TEXT2 mode.
    - 16 colours+border emulation (AGA chip set only)

    MSX2 Emulator v2.0: (July'95)

    - MSX2 Sprits emulation in GRAPH 4 & 6 (scr 5 & 7) modes.
    - Z-80A Stack overflow support.
    - Z-80A secret instrucrions totally supported.
    - Re-designed and re-programmed MSX-Video (copy)
    - SCC emulation.

```
    MSX2 Emulator v2.1:  (August'95 - Last version)
    -------------------
    - MSX-Video totally emulated.
    - Better SCC emulation and SCC+ support.
```

1.18   The Portable MSX2 Emulator.

```
    Copyrights
    ----------

    DEVPAC III is © HiSoft.
    GadToolsBox is © Jaba Development.
    mfm.device is © Commodore-Amiga inc.
    MSX Roms are © ASCII corporation.
    The Portable MSX2 Emulator is © Juan Antonio Gómez (RED Soft S.L)
    fMSX Emulator is © Hans Guijt and Marat Fayzullin.
```

1.19   The Portable MSX2 Emulator.

```
    Greetings.
    ----------
```

I wish to greet all following people their helps in the developement of
the MSX emulator:

    - Manuel Hiniesta for his great ideas and letting me test all I wanted
on his MSX2, and for talking about my emulator in 6th MSX-Party in
Barcelona.

    - Jordi Tirado for lending me some books.

    - Sergi Martinez for his PSG emulation and many other helps, and for
looking for information about diskdrives and Z-80A secret instructions.
Greets also for uploading the emulator to some BBSs and for his helps during
the developement of the program.

    - Ronald Gorter and Albert Siersema for all informations about MSX's
disk drivers.

    - Alberto Orante for Workbench's MSX icons and for trying to find
information about MSX diskdrives.

    - Toni Pomar for telling me Z-80A secret instructions. (Only you and me
know how hard is to code a Z-80A emulator, isn't it? Good luck with your
ZXAM Spectrum +3 128Kb emulator!)

    - MEGA Soft for all MSX games.

    - Juanma & Rafa Romero for letting me test the emulator on their
A1200+32bit Fastmemory.

    - Alex Baque (Nuku-Nuku/Future Brain) for letting me test the emulator

on his A4000/030 - 33Mz.

    - Miguel Angel (Puck/Unknowns) for testing the emulator on his A1200 +
fast 16bits. (PCMCIA)

    - Joan Sola for uploading the emulator trough InterNet.

    - Ramon Ribas for showing the emulator at Tilburg MSX-party in the
Netherlands.

 <*=*> Thanks to all following people for their moral support:

    - All Mezcal group. (Leviathan, Frank-Einstein and Wolf Man)
    - José García, Raul Ureña, Ricardo Martínez, Eduardo Martínez (your
texts in MSX-Club magazine are excellent), Javier López, Antonio Olivero and
Jose Carlos de Albuquerque.

 <*=*> This program is dedicated to my BEST friends: (Not in special order)

    Manuel Hiniesta, Jordi Tirado, David Rael, José Alvelo, Francisco
Carretero, Toni Molar, Isa Cabello, Bea Román, Loli Sánchez, Ana Cabello,
Montse Mansilla and my little sister Rafy.

    Well, that's all. Now, I going to find Madoka...

            <=---=>
                            Juan Antonio Gomez - Programmer.

                Thanks to Escom Amiga for being the best computer.