

MMKeyboard

Guido Mersmann

COLLABORATORS

	<i>TITLE :</i> MMKeyboard		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
WRITTEN BY	Guido Mersmann	August 13, 2022	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

Contents

1	MMKeyboard	1
1.1	MMKeyboard	1
1.2	Introduction	1
1.3	Systemrequirements	1
1.4	Features	2
1.5	Distribution	2
1.6	How to install MKeyboard	2
1.7	History	2
1.8	Future	4
1.9	Buglist	4
1.10	Thanx	5
1.11	The Author	5
1.12	Other programs!	5
1.13	The Interface Hardware	6
1.14	The big keyboard test	7
1.15	Questions, Solutions and Tips!	7
1.16	There are many missing or auto repeating keys!	8
1.17	The keyboard is making trouble!	8
1.18	My hardware isn't working! Why?	8
1.19	After a system crash I don't get a password requester! Why?	9
1.20	Is there a way to buy the hardware?	9
1.21	Can I use MKeyboard with my A1200 Tower?	9
1.22	What is a PIC?	9
1.23	How to change the PIC configuration?	10
1.24	Why is the PIC configuration so stupid?	10
1.25	Is there a way to tune the hardware?	10
1.26	I want to adapt an ATX power supply, but I don't know how!	11
1.27	How can I switch my Amiga on and off by using the keyboard?	11
1.28	Do I need the commodity? It seems to work without!	11
1.29	What is a 'Reset Handler' doing?	12

1.30	Can I play my old games with your hardware?	12
1.31	Can I use my old hardware with your commodity?	12
1.32	MMKeyboard - Main set-up	12
1.33	Main Set-up - Keyboard Set-up...	13
1.34	Main Set-up - Password Set-up...	13
1.35	Main Set-up - PIC Set-up...	13
1.36	Main Set-up - The Key List	13
1.37	Main Set-up - New...	13
1.38	Main Set-up - Edit...	13
1.39	Main Set-up - Remove...	13
1.40	Main Set-up - Save	14
1.41	Main Set-up - Use	14
1.42	Main Set-up - Cancel	14
1.43	MMKeyboard - Password Set-up	14
1.44	Password Set-up - Password GUI	14
1.45	Password Set-up - Open on Screen	14
1.46	Password Set-up - Password GUI Activ	15
1.47	Password Set-up - Use	15
1.48	Password Set-up - Cancel	15
1.49	MMKeyboard - Password GUI Set-up	15
1.50	Password GUI Set-up - Screen Mode	15
1.51	Password GUI Set-up - Font	15
1.52	Password GUI Set-up - Text Position X	16
1.53	Password GUI Set-up - Text Position Y	16
1.54	Password GUI Set-up - Window Position X	16
1.55	Password GUI Set-up - Window Position Y	16
1.56	Password GUI Set-up - Save	16
1.57	Password GUI Set-up - Test...	16
1.58	Password GUI Set-up - Cancel	16
1.59	MMKeyboard - Hotkey Set-up	17
1.60	Hotkey Set-up - Name	17
1.61	Hotkey Set-up - HotKey	17
1.62	Hotkey Set-up - Execute type	17
1.63	Hotkey Set-up - Stack	18
1.64	Hotkey Set-up - Command	18
1.65	Hotkey Set-up - Current Directory	18
1.66	Hotkey Set-up - Output File	18
1.67	Hotkey Set-up - Use	18
1.68	Hotkey Set-up - Cancel	18

1.69	The Name Window	19
1.70	The List Selection Window	19
1.71	MMKeyboard: Keyboard Set-up	19
1.72	Keyboard Set-up - Key List	19
1.73	Keyboard Set-up - Load...	20
1.74	Keyboard Set-up - Save...	20
1.75	Keyboard Set-up - Remove	20
1.76	Keyboard Set-up - Remove All...	20
1.77	Keyboard Set-up - Name	20
1.78	Keyboard Set-up - Value	20
1.79	MMKeyboard: PIC Set-up	20
1.80	PIC Set-up - Password Mode	21
1.81	PIC Set-up - Password Hotkey	21
1.82	PIC Set-up - Power Mode	21
1.83	PIC Set-up - Power HotKey	22
1.84	PIC Set-up - Screen Flip	22
1.85	PIC Set-up - PrintScr	22
1.86	PIC Set-up - Break	22
1.87	PIC Set-up - Right CTRL	22
1.88	PIC Set-up - Home	22
1.89	PIC Set-up - End	23
1.90	PIC Set-up - Page Up	23
1.91	PIC Set-up - Page Down	23
1.92	PIC Set-up - NumLock	23
1.93	PIC Set-up - CapsLock	23
1.94	PIC Set-up - Help	23
1.95	PIC Set-up - Alt<>Amiga Swap	24
1.96	PIC Set-up - Set-up PIC Configuration...	24
1.97	PIC Set-up - Configuration Value	24
1.98	index	24

Chapter 1

MMKeyboard

1.1 MMKeyboard

MMKeyboard V1.20

(C)2001-2002 by Guido Mersmann

MMKEYBOARD IS A GIFTWARE PRODUCT

READ THE DISTRIBUTION SECTION FOR INFORMATION ON DISTRIBUTION

Contents ----- [Introduction](#)

[System Requirements Feature List](#)

[Distribution How To Install](#)

[MMKeyboard Hardware](#)

[The big keyboard test FAQs](#)

[History Future](#)

[Bug List Thanx](#)

[The Author My other amiga projects!](#)

1.2 Introduction

Introduction

Why another interface for IBM-PC keyboards? Well, it's very easy. There weren't any perfect working interfaces available. In addition to that, there was no interface that supported the multimedia keys.

MMKeyboard supports any key on any keyboard! No special driver for each keyboard like on the PC! Only one small commodity for all keyboards is required to smuggle the multimedia keys into the system.

1.3 Systemrequirements

System requirements

MMKeyboard (should work) works on all Amigas with OS 2.0 or higher. Some features require OS3.0 or up!

There is also a [interface hardware](#) and a windows keyboard with windows keys required!

1.4 Features

Features

- Commodity
- All multimedia keys are supported! (play, pause, wakeup, standby, ...)
- Real hardware password with (optional) software GUI
- Full **reset handler** compatible!
- Powermode allows to turn on and off your Amiga by using the keyboard.
- Easy configuration
- Online Help
- 100% Assembler
- Locale Support

1.5 Distribution

Distribution

This program should be published on every public medium, as long as all files in the archive are unchanged. If this medium is a CD I expect a free copy. (AminetCDs excluded)

MMKeyboard is Giftware.

I expect from everybody, who uses MMKeyboard, to send me a little gift. I think this does not hurt anybody, and I will have more fun to integrate new features.

I am not liable for injures or data loss caused by MMKeyboard! The use of MMKeyboard is on your own responsibility !!!

1.6 How to install MMKeyboard

How to install MMKeyboard

Just use the include installer script to install this application!

Don't try to install this archive by hand, because this may cause many trouble. The automatic installation ensures a minimum use of disc and memory space!

1.7 History

History

This text is telling the story of MMKeyboard like a diary.

V0.35

First version.

V0.36

FEATURE: Separated commodity and preferences program. FEATURE: Now it's possible to swap the Win and Alt keys to place the Amiga keys next to the space key like on original Amiga keyboard. FEATURE: Small keyboard configuration menu! FEATURE: The mouse is blocked during password seccion. FEATURE: Now its possible to create a personal password requester

V0.36 - V0.62

CHANGED: Many internal changes (file structure, directory, icons, GUI). CHANGED: Installer Script. CHANGED: Many small changes on the PIC software. FEATURE: Some password GUIs included. (Thanks to Timo Hegemann) FEATURE: It's possible to deactivate The **password GUI** . FEATURE: Now it's possible to display the password GUI on a **separate screen** . FEATURE: The keyboard is now full reset-handler compatible! FEATURE: It's possible to connect **optional LEDs**

V0.63

FEATURE: PowerUp/PowerDown by using the keyboard!

V0.64

BUGFIX: Fixed EnforcerHit caused by MMKeyboardPrefs! FEATURE: A new **PIC set-up** allows to easy config the PIC!

V1.00

First non beta aminet release!

V1.01

BUGFIX: Small PIC change! (no update required)

V1.02

CHANGED: Many manual changes.

V1.03

FEATURE: The **main window** is now sizeable!

V1.04

FEATURE: The **keyboard set-up** is now sizeable.

V1.05

FEATURE: Second power line signal for direct use with ATX-power supply.

V1.06

BUGFIX: Many internal enhancements! (password request)

V1.07

BUGFIX: Removed small error within the Amiga resync code. This bug caused a repeated "" after sync lost!

V1.08

BUGFIX: I forgot to predefine the MenuPop key! (Thanks to Jeff Pierce)

V1.09

CHANGED: Documentation update!

V1.10

BUGFIX: Added a small workaround for the "missing password picture" problem! It seems that it's a ILBM/picture datatype problem, because sometimes the DTA_Sync message is missing.

V1.11

CHANGED: Small PIC change! There is no update needed! By using the new hex file the password hotkey is "scroll lock"! It more logic now! The scroll lock light is used for password indication and the key is activating the password. F11 can be used as free hotkey! BUGFIX: The password screen is now opening with the default font when the specified isn't available. (reported by Klaus von der Haar) INFO: The "Missign password picture" problem isn't gone! The problem is the ILBM Datatype which isn't displaying the picture at all, even when refreshing it via brute force method. If this is happening on your system then use a different file format! The RGFx or PNG seem to be a good choice!

V1.12

CHANGED: Reworked the "Enter Hotkey" window. The previous version was only a big hack. BUGFIX: Fixed the trash file problem when quitting MMKeyboard prefs. BUGFIX: No more hardware problems! The PIC is now auto resetting itself!

V1.13

BUGFIX: Small fix for the password mode, that may be caused by some hardware versions! (depends on the R/C tolerance)

V1.14

BUGFIX: The keyboard repeat wasn't filtered correct! (Reported by Thomas Wenzel) FEATURE: Optional Reset Switch BUGFIX: Fixed GUI barlabel spacing.

V1.15

CHANGED: Manual changes. FEATURE: Added a picture of my interface.

V1.16

CHANGED: Manual changes. BUGFIX: The **input window** had a gadget positioning error. FEATURE: Now it's impossible to use F12 as power key, because this is blocking the PIC set-up. (Reported by Michael Göcken) BUGFIX: Normal hotkeys like "control alt f4" didn't work! Nobody noticed this bug before. In my case I forgot to remove ToolManager, so it looked good until I removed this tool. FEATURE: After loosing power the interface is using the last system power state. FEATURE: Now it's possible to change the PIC set-up by using MMkeyboardPrefs. This feature requires a PIC software version 1.16 or better.

V1.17

BUGFIX: The pretyped character in password window is now gone. FEATURE: Now nearly 256 additional MM-keys are supported.

V1.18

FEATURE: An optional switch allows to shut down and power up your system. This feature requires a PIC software version 1.18 or better. FEATURE: New "pseudo" hotkey! "KBPlug" allows to execute a program when the keyboard is plugged in. This feature requires a PIC software version 1.18 or better. FEATURE: New "pseudo" hotkey! "KBRESET" allows to execute commands right before the system **resets** .

V1.19

BUGFIX: Fixed window sizing bug within the **keyboard editor** . CHANGED: Reworked the **main window** and added a new **password set-up** . CHANGED: Many catalog changes. BUGFIX: Closed password pack door. (Don't ask!) (PIC software version 1.19 or better required). CHANGED: Manual changes. FEATURE: Added new password gui. FEATURE: Now it's possible to set-up the password gui with MMKeyboardPrefs. FEATURE: New Password gui screenmode selector. FEATURE: Now it's possible to test the password gui by using MMKeyboardPrefs. FEATURE: **Right control key** may be used as MultiMedia key, too. (PIC software version 1.19 or better required) BUGFIX: The pressed hotkey wasn't removed correctly from the key stream. This caused unwanted input in the active window. FEATURE: **New execute type : Internal Command** .

V1.20

FEATURE: New schematic for 1200 included. Thanks to Olivier Croquette for the information. FEATURE: Keymaps for win keyboards included. FEATURE: Preset for Highscreen MCK-800 keyboard included. Thanks to Norman Thiel! BUGFIX: The command gadget in the hotkey setup wasn't working correct when used in key command mode. (reported by Norman Thiel) FEATURE: Now it's possible to select the **internal commands** by using a popup window!

1.8 Future

Future

I don't know. (-8 Your wishes are welcome.

1.9 Buglist

Buglist

When pressing many keys at the same time the whole keyboard handling is freezing! The problem is the keyboard protocol. The amiga keyboard is just sending one up and down message for each key, but the PC keyboard is auto repeating key down messages.

1.10 Thanx

Thanx

Stephen Marsden for the idea and the PIC hardware design!

Thanks to Jeff Pierce for the money!

Jørn Rune Jakobsen and Tommy Alvern for the money! Thank you!

Thanks to Michal Ruddanský for the ATX information!

1.11 The Author

The Author

If you find bugs please report them, so that I can correct these bugs in the next version.

Any ideas and suggestions are welcome, too.

Guido Mersmann Glatzer Straße 12 48477 Hörstel Germany

INTERNET: geit@gmx.de FIDONET : 2:2449/246.15

1.12 Other programs!

Other programs! BoulderDäsh [game/jump/boulderdaesh.lha]

Clone of the original Boulderdäsh for Amiga. It is the only version running faster on Amiga than the original. It looks and behaves like the original. I was asked, where the C64 is. (-8 And all this on a 68000 without Fastmem.

SimpleCat [dev/misc/simplecat.lha]

This tool is for programmers and user. Using this program you can change catalogs of programs with your favourite text editor in the easiest way. These programs must include a CS file. Search for it in the archive of the catalogs drawer.

Afind [util/misc/afind.lha]

With this program you can search for programs on your Aminet CDs in the easiest way. It is the same than the original tool on the CD, but here you can use AminetCDs and AminetSets mixed. So you are not forced to search for a program on the first 5 Aminet CDs, that is on AminetSet1 Disc b.

AView [util/misc/aview.lha]

AView is a great multiview enhancement/replacement! It is working like Multiview, but you are able to specify a special viewer/player for each file type.

Guideformat [text/edit/guideformat.lha]

GuideFormat is a simple tool. It is easy to format text blocks, even if there are "links" or other guide commands in.

GuideCheck [text/edit/guidecheck.lha]

GuideCheck is a tool, that allows to check an entire guide file and discovers all errors!

SiedlerBoot [game/patch/siedlerboot.lha]

This allows to start the Settlers direct via CD and save the scores on HD. There is no hard disc install required. SiedlerBoot requires the "Amiga Plus Sonderheft 9" cover CDROM.

Execute64 [misc/emu/execute64.lha]

Execute64 allows to transfer file direct into the C64 and to start them. This allows to play games an use the Amiga a big file server.

R [util/cli/r.lha]

"R" creates a GUI for each DOS Program. This allows you to use DOS commands even if you aren't very good in reading templates.

DVBControl [comm/misc/dvbcontrol.lha]

DVBControl is a software project for the Nokia MediaMaster (D-Box) and DVB2000 firmware. It allows to update firmware, edit channel settings and much more. So if you are using DVB2000 and an Amiga DVBcontrol is your only choice!

MCCControl [hard/hack/mccontrol.lha]

MCCControl (MemoryCard Control) is a card reader for Playstation MemoryCards. It requires a little self made hardware (~\$5) and the free software!

VBRControl [util/sys/vbrcontrol.lha]

VBRControl moves the processor vector base to fast ram. This is increasing system speed.

AvailCPU [util/sys/availcpu.lha]

AvailCPU is a little program that shows the CPU usage by using the Power LED!

TrackDisplayClock [util/time/trackdisplaycl.lha]

A hardware track display is very useful, if you need it! The most time this type of hardware is only good for lighting up the room! This will be changed when using TrackDisplayClock! TrackDisplayClock displays the system time on your track display! Its cool, its useful and of course the time is always in visual range. Delete all programs using screens, windows or icons to display the time and of course don't forget to remove your noclick tool! TrackDisplayClock is doing all these jobs and your system will be faster than before! (-8

MMKeyboard [hard/hack/MMKeyboard.lha]

MMKeyboard is a hardware for using IBM-PC keyboards on Amiga. It allows to use multimedia keys like Play or Pause. MMKeyboard supports any key on any keyboard! No special driver for each keyboard like on the PC! Only one small commodity for all keyboards is required to smuggle the multimedia keys into the system. MMKeyboard is full reset handler compatible, contains a internal hardware password, allows to turn your Amiga on and off by using the keyboard and much more.

ParKeyboard [hard/hack/ParKeyboard.lha]

ParKeyboard is a small hard and software project that allows you to use an Amiga keyboard connected to the parallel port. The interface didn't contain any components. Just four wires are required to adapt the parallel port.

WheelMouseSupport [util/mouse/WheelMouseSupp.lha]

WheelMouseSupport is a WheelBusMouse Software replacement. It allows to use the mouse wheel with most Amiga programs without any patches.

1.13 The Interface Hardware

The Interface Hardware

If you're not able or want to create the interface yourself, then it's possible to [buy](#)

The interface is very easy! If you already build the IBMKey Hardware delivered by the EPic Archive, then just update the [PIC](#) .

Here are some optional features for the hardware and a schematic for the A1200.

Depending on your Amiga and your keyboard other connectors are used, thats the reason the schematic is universal. Because of the size it's not very easy to solder PS/2 Plugs, so I recommend to cut an extender cable.

Here is a picture of my interface. The PIC fits exact into a 9 to 9 sub-d interface box. The box endings are filled with small plastic piece's cut from a standard disc.

You shouldn't make the wires to long! Just use 10cm or less on each side should be enough. You're able to use an extender if required!

The circuit itself can be done on a simple PCB tracks or completely without! Just make sure there aren't any shortcuts. It's possible to create an interface that isn't much bigger than the PIC itself.

Please also read the information about the **PIC** !

If there are any problems then read the **FAQ** section for further information!

Predefined special keys:

Key Amiga result ----- Home Shift Cursor Left End Shift Cursor Right PageUp Shift Cursor Up PageDown
Shift Cursor Down PopUp Left Amiga m (Screen flip) PrintScr Right Amiga p Break Control c Insert Help F11 MultiMedia
Extension Hotkey F12 MultiMedia Extension Hotkey ScrLock MultiMedia Extension Hotkey Left Win Left Amiga Right Win
Right Amiga

1.14 The big keyboard test

The big keyboard test

Well, this list contains keyboards tested with the **MMKeyboard Hardware** . If you keyboard is not listed, then sent **in** your information to fill up the list.

The number of multimedia keys is exact the number of new keys and does not include the additional key created by MMKeyboard.

Name Result MM-Keys Testet by -----

Chicony 100% 17 Guido Mersmann

Logitech Cordless Desktop 100% 12 Guido Mersmann ITouch

Logitech Cordless ITouch 100% 3 Guido Mersmann

Cherry Keyboard Win95 D 100% 0 Guido Mersmann

Yahoo Freedom II 100% 17 Guido Mersmann

TrustGM Wireless 100% 16 Michael Goecken

H&H KB 07 IR 100% 41 Klaus von der Haar

Maxell 100% 3 Olivier Croquette

1.15 Questions, Solutions and Tips!

Questions, Solutions and Tips!

Interface Hardware Problems

There are many missing or auto repeating keys Some keys aren't working and others are causing trouble!

The Scrollock light is flashing! My hardware isn't working at all! Why?

After a system crash I don't get a password requester! Why?

Interface Hardware Information

Is there a way to buy the hardware? Can I use MMKeyboard with my A1200 Tower?

What is a PIC? How to change the PIC configuration?

Why is the PIC configuration so stupid? Is there a way to tune the hardware?

I want to adapt an ATX power supply, but I don't know how! How can I switch my Amiga on and off by using the keyboard?

Interface Software

Do I need the commodity? It seems to work without! What is a 'Reset Handler' doing?

Can I play my old games with your hardware! Can I use my old hardware with your commodity?

1.16 There are many missing or auto repeating keys!

There are many missing or auto repeating keys

You should check the shielding of your interface!

Under normal circumstances the shield wires should be only connected on one side. Well, in this case you can ignore this rule, because the MMKeyboard interface acts between keyboard and amiga. The keyboard shield is already disconnected on one side of the keyboard cable, so you should connect the shields on your interface.

A metalized box containing your interface may be good additional shield! Make sure your hardware isn't in contact with the box, because the box acts like metal and connects everything as good as it shields.

If the problem is still present, then the wire may be too long. Under normal circumstances this isn't a real problem, but it may cause trouble. I suggest to use a small wire (10cm) on each side of the interface. Later you can try an extender cable.

If you build your interface into a tower or desktop system make sure not to use too long wire for LED connection. It may be required to use a line driver to avoid PIC trouble.

1.17 The keyboard is making trouble!

The keyboard is making trouble!

The data part of the PIC is holding the PIC configuration! The software you used to program the PIC didn't program the default values. So the previous state (aka trash) of the data memory is interpreted by MMKeyboard as config.

Now there are three possibilities why this happens:

1. If the keyboard is working, then use the **PIC set-up window** to create a valid configuration. Make sure you enter a proper password, too!
2. If the scroll lock light is flashing and the keyboard is not working (if MMKeyboard commodity is running, the mouse isn't working, too!) then the only way is to use the MMKeyboardNP.hex. This file isn't asking for a password and you're able to **disable** or set-up it. After doing this, reprogram the PIC by using the normal MMKeyboard.hex. This problem isn't caused by MMKeyboard. Your PIC programming tool didn't write the data part of the PIC, where the (default) settings are stored.
3. If the scroll lock light is flashing after pressing the reset combination, then the system keyboard interrupt was killed somehow. This may happen by games without any keyboard support. This is normal and even happens when using an original Amiga keyboard. The Amiga isn't responding to the reset warning and the keyboard or in this case MMKeyboard is delaying the reset. Just wait a few seconds and your system will restart.

1.18 My hardware isn't working! Why?

My hardware isn't working! Why?

Well, that is not that easy! You should not use a wireless keyboard for testing, because that may cause additional problems. The best thing is to use a cheap standard Windows keyboard.

First remove the PIC and connect pin 2 and pin 6 on the PIC socket. Do the same with pin 3 and pin 7! The result is a very short keyboard extender!

Now check all wires from the keyboard side to the amiga side! The 4 wires (5V, GND, Clock, Data) must be 1:1 connected.

If everything is ok, then use your hardware (don't remove the bridges) to connect an Amiga-keyboard to your Amiga. If no Amiga-keyboard is available use a PC-keyboard and a PC instead! (remember: The hardware acts like an extender cable)

Some things you should check until the extender is working:

Is there keyboard power? (keyboard lights are flashing on powerup?) Is GND connected to the PIC (Pin 5)? Is MCLR (Pin 4) connected to 5V? Are the values for the resistor and the capacity correct? Are resistor and capacity connected correct? (Pin 16, 5V, GND) Are clock and data are connected to the right PIC pins? Are clock and data swapped on one or both sides of the PIC?

1.19 After a system crash I don't get a password requester! Why?

After a system crash I don't get a password requester! Why?

The reason is simple!

How should the keyboard (MMKeyboard hardware) notice that a crash happens? The same is happening you use a reset tool to restart your system.

If you want to secure your system then use the **password key (ScrLock)** ! Once used it's impossible to reset the system by keyboard and any system crash or software reset is only reloading the system and asking for a password again. Without password the system is totally locked!

1.20 Is there a way to buy the hardware?

Is there a way to buy the hardware?

Yes! You should contact me via **EMail** first.

I am only assembling a small number of interfaces at once, so it may take a while before you'll get one.

Here you can see what you'll get. Of course there'll be a **PIC** equipped, when you'll get it, but anyone knows what an IC is and the interesting part is the interface. Here is the same interface closed. The interface connectors are PS/2 only! If you need a DIN connector then you can get a interface for 1 Euro or by a interface in your locale computer store.

You have to pay 25 Euro (50 DM) for each interface. This is only for parts, shipping and the time I spent to build them. For selling into non Europe country's it's required to pay 30 Euro.

Don't ask for programmed PIC chips. I made bad experiences, so I only sent complete interfaces.

1.21 Can I use MMKeyboard with my A1200 Tower?

Can I use MMKeyboard with my A1200 Tower?

Yes and No! When your tower is using a standard A2000, A3000 or A4000 keyboard then you can use MMKeyboard without any problem. If there is a PC keyboard connected then there is no chance to connect MMKeyboard there!

It's not possible to plug the MMKeyboard interface into your old interface, but you can connect the interface to your mainboard.

This is because your old interface expects a PC keyboard to be plugged in. The MMKeyboard hardware is acting like an Amiga keyboard. It's not possible to link keyboard interfaces together.

1.22 What is a PIC?

What is a PIC?

A PIC is a one chip computer! It contains a processor, RAM, program (FLASH) and data (EEPROM) memory!

Most of it's pins can be used free by the internal program. It's possible to read and write any IO state the application requires.

A PIC can be used as clock, as combination lock, as copy protection for software and much more! Years ago big circuits or expensive chips were required to do what a little PIC is doing alone.

There are many PIC types available. The most used processors are the PIC16c84 and the PIC16f84 created by Microchip. The only difference is more memory and EEPROM data space. The c84 isn't available anymore, because the f84 is better and compatible.

Before a PIC can used in a circuit, its required to set-up the program and the data. This procedure requires a special device: A PIC programmer.

When programming a PIC it's required to keep an eye on the fuses. There are fuses for enabling the WatchDog-Timer (WDT), the PowerUp-Timer (PWRT) and the CodeProtection (CP). The WDT must not be used without program support, because nothing is working in the result. The PWRT takes care of the PowerUp and delays a little to allow the hardware to settle. This fuse should be enabled, as long as there isn't reason for immediate start-up of the PIC. The CP Fuse disables the PIC readout. It's not possible to readout the PIC any more.

1.23 How to change the PIC configuration?

How to change the PIC configuration?

Before making changes to the PIC set-up you need your personal settings!

Use the **PIC set-up window** to enable the features you need. The configuration is done by the **set-up PIC configuration** gadget in the same window.

1.24 Why is the PIC configuration so stupid?

Why is the PIC configuration so stupid?

That's a very good question!

If the PIC configuration should be changed without an external programmer, then it is required that the PIC is doing the flash writing. The problem is that the PIC is unaware of the users wishes, so the user needs to enter the set-up by hand. The lucky part is that the keyboard is already connected.

In theory it's possible to program the PIC by using MMKeyboardPrefs on Amiga, but this would require an additional protocol to transmit chars in the opposite direction. The problem is that the PIC code memory is too small to hold this additional transfer stuff. On the other side the Amiga part would be a bad hack, which would require a system disable during transfer.

I think this "set-up for stupids" is a good alternative.

If you don't want to use the GUI feel free to use an editor or the shell. Press "LAmiga" + "RAmiga" + "F12" to turn the PIC into set-up mode. The PIC is printing a "+" to indicate that this is the main menu. Now press "1" for password, "2" for config or any other number or char to leave the menu and return to normal keyboard operation.

After pressing "1" you must enter the password. Press the "return"-key (not the "enter"-key) to finalise the password and return to the main menu ("+").

After selecting "2" you must enter the **configuration value**. After pressing the last value the PIC returns into the main menu ("+").

This is an example to set the password to "password" and the **configuration value** to "f2c5ff3f". The "+" chars are created by the PIC, when it re-enters the main menu. On the screen it looks like this:

```
+1password+2f2c5ff3f+3
```

After the "+" character the menu selection ("1", "2" or "3") and the argument is following.

A special note to any advanced amiga user! Using the clipboard or any other key inserting tool isn't working, because the settings must be typed in by keyboard only!

1.25 Is there a way to tune the hardware?

Is there a way to tune the hardware?

Yes! You are able to connect 4 LEDs to display the keyboard status of "NumLock", "CapsLock" and "ScrollLock". This is very useful when using a keyboard without these LEDs (e.g. Logitech iTouch).

The "ScrollLock" light isn't required on Amiga, but I used it to indicate password request and "Wait for 10 seconds time-out" mode when using a reset handler.

The last line is active if the password is correct! This line is also useful if you want to disable other hardware until the password is correct (Mouse, ...)! Just let me know what you used the line for! It's possible to connect the password line direct with pin 6 of the mouse connector. This disables the mouse until the password is correct. This is also working when using the PS2M interface.

A special feature is hidden behind the PowerUp Line. Just think about activating your Amiga by keystroke. When using an **ATX power supply this can be done** without any additional hardware.

It's also possible to switch power on or of by using a switch on your computer case. A special PIC line is used to handle this.

Take a look on this picture for more information.

1.26 I want to adapt an ATX power supply, but I don't know how!

I want to adapt an ATX power supply, but I don't know how!

Any modifications are on your risk only. I am not responsible for any hard or software damage.

The easiest way is to use an ATX extender. Cut it into two peaces. Cut the power connector of your old power supply. Connect Amiga plug and the ATX connector by using the correct voltages. Make sure that all connections are correct, or you blow up all your hardware at once. Isolate unused voltages as well as the connections. The result is a ATX to Amiga interface.

Now there are only PowerGood, Standby GND, Standby 5V and Standby Switch left.

PowerGood must be connected to the main board, if the board supports PowerGood. The A4000D is the only Amiga supporting this line. The A4000T isn't supporting PowerGood. Just connect it or isolate it.

Now there are only Standby GND, Standby 5V and Standby Switch left. This lines needed to be connected like shown in this picture.

1.27 How can I switch my Amiga on and off by using the keyboard?

How can I switch my Amiga on and off by using the keyboard?

Very easy! You need to connect a standard **ATX power supply** and build the standard MMKeyboard hardware.

There are only three things to take care of:

The PIC and Keyboard power must be connected to 5V Standby of the **ATX power supply** . Important is that there must not be any other 5V connected.

Connect all GND lines on the interface. It may work, but to guarantee a stable hardware the connections are recommended. The lines to connect are: Standby-GND (power supply) GND (original Keyboard connector (not available on A1200)) and the GND line of the new PS/2 keyboard connector.

The Standby-Switch wire needs to be connected to PIC (Pin 11).

Here a small picture to show the needed connections.

1.28 Do I need the commodity? It seems to work without!

Do I need the commodity? It seems to work without!

Of course the hardware is working without the commodity! The commodity is only required for multimedia key support.

1.29 What is a 'Reset Handler' doing?

What is a 'Reset Handler' doing?

The reset handler in the most cases is used to do cleanup stuff right before the system resets. This feature is used only by a few tools and file systems, but it is very useful.

Just think about a filesystem using a write cache. The handler allows to store the cache on HD before system reset. A text editor may backup a text just in case the user forgot to save. I am using the reset handler to eject my ZIP disc, because there shouldn't be a disc in the drive on power off.

The reason that this handler is used rarely is that it's normally only working on A2000, A3000 and A4000. Even some A2000 and A3000 keyboards don't support the reset handler stuff. By using MMKeyboard hardware any Amiga should be able to use a reset handler. If you are using the **power mode** then the reset handler is working before power off, too!

There are a few limits dictated by the handler mechanism:

There is no way to avoid the reset. Around 10 to 12 seconds after pressing the reset keys, the system is restarting. This should be enough time to do what is required.

It's not possible to use the keyboard during this reset delay phase, because if the Amiga is answering to the handshake the keyboard is allowed to do a real reset. If your handler only needs a second and there aren't other programs using it, then the reset delay is only one second long.

The handler only gets active when the keyboard was used to reset. An external reset button or a system crash won't cause the handler to act.

1.30 Can I play my old games with your hardware?

Can I play my old games with your hardware?

Of course! There shouldn't be any problem!

1.31 Can I use my old hardware with your commodity?

Can I use my old hardware with your commodity?

No! Standard keyboard interfaces are transmitting the amiga keys only, so there is nothing for the commodity to do.

If you own a selfmade hardware, then make sure it's the same hardware. In this case just reprogram the PIC and you're able to use all new features.

My hardware is using a special transmission technique that allows my commodity to filter all non amiga keys out. This is very tricky, because the keyboard transmission must be 100% compatible when working without the commodity. This is required to support games or old applications which are handling the keyboard stuff itself.

1.32 MMKeyboard - Main set-up

Main set-up

Well, there isn't much to say! Here're the gadgets of the preferences program:

Keyboard set-up [Keyboard set-up](#)

[Password set-up](#) [PIC set-up](#)

Hotkey set-up [Key List](#)

[New...](#) [Edit...](#)

Remove...

Save Use

Cancel

----- Main Window Edit Window Keyboard set-up Password set-up
Password GUI Set-up PIC Set-up

1.33 Main Set-up - Keyboard Set-up...

Keyboard Set-up...

This button opens the **keyboard set-up** window.

1.34 Main Set-up - Password Set-up...

Password Set-up...

This button opens the **password set-up** window.

1.35 Main Set-up - PIC Set-up...

PIC Set-up...

This button opens the **PIC set-up** window.

1.36 Main Set-up - The Key List

The Key List

This list contains all user defined hotkeys. By pressing return or using the **edit** gadget you are able to **edit** the keys. The **new** gadget allows to add a new key and the **remove** gadget allows to delete one!

1.37 Main Set-up - New...

New...

This button opens a text input field. Here you can specify a name for the hotkey. This name will be listed in the **key list** gadget. It's possible to change the name by using the **name** gadget of the **edit** window.

If you proceed the **edit** window opens automatically.

1.38 Main Set-up - Edit...

Edit...

By pressing on this button the **edit** window opens and allows you to change the hotkey settings.

1.39 Main Set-up - Remove...

Remove...

After a safety request the selected hotkey will be deleted!

1.40 Main Set-up - Save

Save

The settings will be saved into MMKeyboards icon and used as well. The hotkey configuration will be stored in the ENV: directory. All MMKeyboard windows will close immediatly.

1.41 Main Set-up - Use

Use

The window will be closed and the settings used, but the settings won't be saved!

1.42 Main Set-up - Cancel

Cancel

This button closes the window and all changed settings are lost!

1.43 MMKeyboard - Password Set-up

Password Set-up

This window contains the whole password GUI set-up!

This window only has a effect on the GUI! The password must be enabled to use the features within this window. **Deactivating the GUI** is only disabling the GUI not the password request itself.

Password GUI

Open on Screen Password Active

Use Cancel

----- Main Window Edit Window Keyboard Set-up Password Set-up
Password GUI Set-up PIC Set-up

1.44 Password Set-up - Password GUI

Password GUI

This gadget allows to specify a GUI for the password session.

Well, these GUI aren't real programmed GUIs! They just require a picture, an icon and a few **tool type settings** .

1.45 Password Set-up - Open on Screen

Open on Screen

If you want the password requester to open on a separate screen then just turn this switch on. Otherwise the request opens on the default screen.

1.46 Password Set-up - Password GUI Activ

Password GUI Activ

This switch enables the password GUI!

Important: The password itself must be disabled by using the **PIC set-up** . It's not possible to deactivate the password without changing the **PIC** ! The password check is hardware controlled! The Amiga is only getting the cursor position!

1.47 Password Set-up - Use

Use

By pressing this button you confirm that the settings within this window are valid.

1.48 Password Set-up - Cancel

Cancel

Closes the window and restores all settings to their previous values.

1.49 MMKeyboard - Password GUI Set-up

Password GUI Set-up

This window allows to change the configuration of the password gui. There is no need to edit the tooltypes by hand, because this window is doing this for you.

Screen Mode

Font Text Position X

Text Position Y Window Position X

Window Position Y Save

Test... Cancel

----- Main Window Edit Window Keyboard Set-up Password Set-up
Password GUI Set-up PIC Set-up

1.50 Password GUI Set-up - Screen Mode

Screen Mode

The screen mode is used when the **'Open on Screen'** option is activated.

If the selected screenmode isn't available on your system, or there isn't enough memory to open the specified screen, the default screen is used as fall back.

Set-up the screen depth to avoid automatic dithering by the datatypes library.

1.51 Password GUI Set-up - Font

Font

This font is used to display the "*" chars during password seccion.

1.52 Password GUI Set-up - Text Position X

Text Position X

The specified value describes the X position of the password text, depending on the left upper edge of the password picture.

1.53 Password GUI Set-up - Text Position Y

Text Position Y

The specified value describes the Y position of the password text, depending on the left upper edge of the password picture.

1.54 Password GUI Set-up - Window Position X

Window Position X

This just describes the window position on screen. A value of zero forces MMKeyboard to center the picture in x direction.

1.55 Password GUI Set-up - Window Position Y

Window Position Y

This just describes the window position on screen. A value of zero forces MMKeyboard to center the picture in y direction.

1.56 Password GUI Set-up - Save

Save

Closes the window and stores the password gui set-up within the pictures icon.

1.57 Password GUI Set-up - Test...

Test...

Opens a fake password window for testing purpose.

Press "return" or left mouse button on the picture to quit password mode testing.

1.58 Password GUI Set-up - Cancel

Cancel

Closes the window and restores all settings to their previous values.

1.59 MMKeyboard - Hotkey Set-up

Hotkey Set-up

This window allows to set-up a hotkey.

Key Set-up **Name**

Hotkey Command Set-up **Execute Type**

Stack Command

Current Directory Output File

Use Cancel

----- **Main Window Edit Window Keyboard Set-up Password Set-up**
Password GUI Set-up PIC Set-up

1.60 Hotkey Set-up - Name

Name

Here you can specify a special name for the hotkey.

The name will only be used for the **Keylist** !

1.61 Hotkey Set-up - HotKey

HotKey

If you want to set-up a multimedia hot key, just press the key or key combination you want!

By using the PopUp Gadget you're able to specify normal system hotkeys like CONTROL ALT HELP.

Of course it's possible to enter all hotkeys by hand, but you should aware that any wrong part will be removed!

There are a few "pseudo" keys that require manuell input:

KBReset

This **command** will be used only when resetting the amiga by keyboard. Qualifier (Shift, Alt, ...) are not allowed. Please note that the reset is delayed until the last KBReset hotkey is executed or the **maximum delay time** is over. If you're using two or more KBReset hotkeys then you must be aware that the second **command** won't be started until the first is done. Avoid starting programs in **WBMode**, because they're started asynchrony and don't delay the reset.

KBPlug

If you plug in a keyboard this **command** will be executed. Normaly such command is useless, but if you're switching your keyboard between PC and Amiga you're able to play a sample or something like that.

1.62 Hotkey Set-up - Execute type

Execute type

This gadget allows to set-up what type of command is specified in the **command** gadget Currently "CLI", "WB", "Key Command" and "Internal Command" are available.

1.63 Hotkey Set-up - Stack

Stack

This gadget specifies the stack for the **command** .

1.64 Hotkey Set-up - Command

Command

The contents of this gadget depends on the **execute type** .

CLI / WB

Path and command name of the command you want to execute.

Key Command

This gadget contains a new key combination. Please note that key groups like "SHIFT" are not allowed. It's required to specify the key. So define "LSHIFT", "RSHIFT" or "CAPSLOCK" instead.

Internal Command

MMKeyboard is supporting a few internal functions for hotkey usage:

WindowFlip: * The next window will activated. WindowClose: The activ window will be closed. WindowMinimize: * The activ window will be minimized if it contains a sizing gadget. WindowMaximize: * The activ window will be maximized if it contains a sizing gadget. WindowZip: * The activ window will be zipped if it contains a zip gadget.

* Please not that the usage of these commands may cause trouble, because they ignore several system programming rules.

1.65 Hotkey Set-up - Current Directory

Current Directory

If you want to change the current directory for the **command** , then put it in here.

1.66 Hotkey Set-up - Output File

Output File

The output of the command can be redirected by using this gadget.

1.67 Hotkey Set-up - Use

Use

The hotkey settings will be used and the edit window will be closed.

1.68 Hotkey Set-up - Cancel

Cancel

Closes the edit window! All changes will be rejected.

1.69 The Name Window

The Name Window

This window allows you to enter a name for the key combination you want to add.

1.70 The List Selection Window

The List Selection Window

This window allows to select a specific entry of a given list.

1.71 MMKeyboard: Keyboard Set-up

Keyboard Set-up

This small editor allows to define names for the new multimedia keys!

It's not required to create such names, but look at the following example:

"CONTROL ALT \$8334" (The hex value is just an example)

Which hotkey is used? MMKeyboard internally only uses these hex values, and you are able to define these Hotkeys by pressing them, but if you later take look on your configuration it's not very handy to deal with hex values and identify the key. After 2 Minutes key set-up the example looks much better:

"CONTROL ALT PLAY"

Before creating your own keyboard setting, you should check if it's already present in the "presets/keyboards/" drawer of your installation. Just try to load and see for your self.

The keyboard editor is very easy to use:

1. Press the key you want to add.
2. Enter the name and press return.
3. If there are more keys to add then proceed with 1.
4. Use the **save gadget** to save the keyboard settings.
5. Send me your configuration to include it into my archive. (-8)

These are the gadgets available in the keyboard editor: [Keyboard List](#)

[Load...](#) [Save...](#)

[Remove](#)

[Remove All...](#)

[Name Value](#)

----- [Main Window](#) [Edit Window](#) [Keyboard Set-up](#) [Password Set-up](#)
[Password GUI Set-up](#) [PIC Set-up](#)

1.72 Keyboard Set-up - Key List

Key List

This listview displays all defined keys by name. It's possible browse by mouse, mouse wheel or keyboard (CRSR UP, CRSR DOWN and RETURN).

To add a key just press it! An existing key can be selected by pressing it, too.

It's only possible to add non standard windows keys! Keys like F11 or PageUp are predefined.

1.73 Keyboard Set-up - Load...

Load...

Here you can specify a keyboard file to load.

1.74 Keyboard Set-up - Save...

Save...

Here you can save the current keyboard settings.

1.75 Keyboard Set-up - Remove

Remove

This button deletes the selected key.

Under normal circumstances it's not wise to delete any key, because the only keys you can add are non Amiga keys and it's not possible to enter one key twice. Well, some keyboards may report ghost keys, so these keys can be removed.

1.76 Keyboard Set-up - Remove All...

RemoveAll...

Here you can delete the entire key list.

1.77 Keyboard Set-up - Name

Name

This input gadget allows to specify the name of the selected key. Spaces and several other keys are not allowed.

1.78 Keyboard Set-up - Value

Value

This little gadget just displays the current key value and is for (my) information only.

1.79 MMKeyboard: PIC Set-up

PIC Set-up

This window allows to set-up the PIC configuration by selecting the features.

Password Options **Password Mode**

Password HotKey Power Options **Power Mode**

Power Key Key Options **Screen Flip**

PrintScr **Break**

RightCTRL Home

End Page Up

Page Down Num Lock

Caps Lock Help

Alt<>Win Swap PIC Configuration Set-up PIC Configuration...

Value

----- Main Window Edit Window Keyboard Set-up Password Set-up
Password GUI Set-up PIC Set-up

1.80 PIC Set-up - Password Mode

Password Mode

This gadget turn on the password request of the PIC.

The real keyboard access is denied until the correct password is entered.

Editing the password by using del, backspace or the cursor keys is not possible! If you make a mistake just press "RETURN" and re-enter the password.

It's not possible to reset your Amiga by keyboard during password request.

Warning: This is a real hardware password! There is no backdoor or something like that! Make sure your password is correct *before* enabling it! If not, it will be required to reprogram the PIC by using an external PIC programmer!

The password is working independent! The **password enable** switch only enables the GUI! After setting this configuration the password will be required even when using a boot disc! The Amiga is only able to display a password GUI! The password itself is checked within the hardware!

1.81 PIC Set-up - Password Hotkey

Password Hotkey

This gadget turns on the password hotkey.

"ScrLock" (re)starts the password protection. This is very useful when leaving your amiga alone for a while. You should read the **password mode** section, before turning this on.

Disabling this gadget allows you to use the key like any other multimedia key!

1.82 PIC Set-up - Power Mode

Power Mode

For this feature **additional hardware** is required!

By using this useful feature it's possible to shut down and restart your Amiga by keyboard.

Make sure you defined the **Power Key** when using this!

To shut down the Amiga just press "RAMIGA" and the **Power Key** . A single second keystroke (**Power Key** only) restarts your system.

The power mode is full reset handler compatible! This means any application using a reset handler has at least 10 seconds time before the system shuts down! If there isn't a reset handler running there is no additional delay!

1.83 PIC Set-up - Power HotKey

Power HotKey

For this feature **additional hardware** is required.

Just press the desired key you want to use as power key. Remember that you are no longer able to use "RAMIGA" in any conjunction with this key, because the system shut down when using this combination.

1.84 PIC Set-up - Screen Flip

Screen Flip

When activated pressing the "Menu PopUp" key (between RWin & RControl key) the amiga receives a "LAMIGA M" (Screen-Flip).

Disabling this gadget allows you to use the key like any other multimedia key!

1.85 PIC Set-up - PrintScr

PrintScr

Pressing the PrintScreen key (aka PrtScr, Druck) the keyboard sends a "RAMIGA P"! This is the standard Amiga key combination for printing.

Disabling this gadget allows you to use the key like any other multimedia key!

1.86 PIC Set-up - Break

Break

Pressing the break key the amiga receives a "CONTROL C"! This combination causes shell programs to quit.

Disabling this gadget allows you to use the key like any other multimedia key!

1.87 PIC Set-up - Right CTRL

Right CTRL

The right control key will act as a normal control key.

Disabling this gadget allows you to use the key like any other multimedia key!

1.88 PIC Set-up - Home

Home

Pressing this key causes a "SHIFT CRSR LEFT".

Disabling this gadget allows you to use the key like any other multimedia key!

1.89 PIC Set-up - End

End

Pressing this key causes a "SHIFT CRSR RIGHT".

Disabling this gadget allows you to use the key like any other multimedia key!

1.90 PIC Set-up - Page Up

Page Up

Pressing this key causes a "SHIFT CRSR UP"!

Disabling this gadget allows you to use the key like any other multimedia key!

1.91 PIC Set-up - Page Down

Page Down

Pressing this key causes a "SHIFT CRSR DOWN".

Disabling this gadget allows you to use the key like any other multimedia key!

1.92 PIC Set-up - NumLock

NumLock

By default this gadget allows to toggle the numpad lock mode.

There is no further use, but some keyboard may require such feature.

Just turn it off to get the normal amiga NumLock key!

1.93 PIC Set-up - CapsLock

CapsLock

By default this gadget allows to toggle the capslock mode.

Disabling this gadget allows you to use the key like any other multimedia key!

1.94 PIC Set-up - Help

Help

By default the "insert" key is used as "Help" key, because on Amiga insert is useless. You are able to use "F12" and/or "Insert" as "help" key

Any unused key is available as multimedia key.

1.95 PIC Set-up - Alt<>Amiga Swap

Alt<>Amiga Swap

This is a special feature! As you may have noticed the windows keys aren't in the same positions like the amiga keys on an Amiga keyboard! On Amiga keyboards the Amiga keys are next to the space key, but on the windows version that's the position of the ALT keys.

Just turn this feature on to swap the ALT and WIN keys. Don't forget to swap the key caps on your keyboard. This may be a good time to kill the windows logo on the keys.

After swapping the keys the Amiga key is ALWAYS next to the space key! Even the PIC internal menu and the power mode are using the new key positions!

1.96 PIC Set-up - Set-up PIC Configuration...

Set-up PIC Configuration...

After skipping saftey requester you'll guided through the PIC Configuration.

It's required that the keyboard is working normal. This means no wrong or repeated chars. This set-up is only changing functions. If your interface isn't working at, then all this set-up won't have any effect. By using this set-up anyway you risk a total configuration damage, which may result in an unknown password.

Important: The predefined password is "amiga", but this default value may not be writting by your PIC programming tool. It makes sense to change the password to "amiga" once before playing around with the set-up. Even if you don't want to use the password you're able to enter it even if it's activated by accident.

If you're asking your self, why the PIC set-up is so stupid, then you should read [this](#) .

Follow the configuration menu word by word. If you make a mistake during the password enter process, then just press "RETURN" and select password again. The PIC configuration itself is auto detecting any error and forces the user to re-enter the data without telling him.

1.97 PIC Set-up - Configuration Value

Configuration Value

This is the configuration value for the PIC when using the settings made by using this window!

It's only useful when doing the PIC Set-up without the [set-up window](#) . It's for experts only. If you don't know what I am talking about then don't think about this gadget.

1.98 index

A

[Additional hardware](#) [After a system crash I don't get a password requester! Why?](#) [Alt<>Win Swap](#) [ATX power supply](#)

B

[Break Bug List](#) [Buy Hardware](#)

C

[Can I play my old games with your hardware!](#) [Can I use my old hardware with your commodity?](#) [Cancel](#) [Cancel Caps Lock](#) [Command configuration value](#) [Current Directory](#)

D

[Deactivating the GUI Distribution](#) [Do I need the commodity?](#) [It seems to work without!](#)

[E](#)

[Edit Window](#) [EMail](#) [End](#) [Execute](#) [Type](#)

[F](#)

[FAQ](#) [Feature List](#) [Future](#)

[H](#)

[Hardware Help](#) [History](#) [Home](#) [Hotkey](#) [How can I switch my Amiga on and off by using the keyboard?](#) [How to change the PIC configuration?](#) [How To Install](#)

[I](#)

[I want to adapt an ATX power supply, but I don't know how!](#) [in input window](#) [Interface - Closed](#) [Interface - Hardware](#) [Interface - Schematic](#) [Introduction](#) [Is there a way to buy the hardware?](#) [Is there a way to tune the hardware?](#)

[K](#)

[Key List](#) [keyboard editor](#) [Keyboard List](#) [Keyboard Set-up](#) [Keylist](#)

[L](#)

[M](#)

[Main Window](#) [Maximum delay time](#) [MMKeyboard Hardware \(Picture\)](#) [MMKeyboard Hardware](#) [MMKeyboard](#) [My hardware isn't working at all! Why?](#) [My other amiga projects!](#)

[N](#)

[Name](#) [Name new](#) [Num Lock](#)

[O](#)

[Open on Screen](#) [optional LEDs](#) [Output File](#)

[P](#)

[Page Down](#) [Page Up](#) [Password Active](#) [password GUI](#) [Password HotKey](#) [password key \(ScrLock\)](#) [Password Mode](#) [Password Set-up](#) [password set-up](#) [PIC set-up](#) [window](#) [PIC Set-up](#) [PIC Set-up](#) [PIC Set-up](#) [PIC Picture - ATX Support](#) [Picture - Interface](#) [Picture - Interface Closed](#) [Picture - Optional Features](#) [Power Key](#) [Power Mode](#) [Predefined](#) [PrintScr](#)

[R](#)

[Remove All...](#) [Remove Key](#) [Remove Hotkey](#) [Reset handler](#) [Reset Switch](#)

[S](#)

[Screen Flip](#) [Separate Screen](#) [Set-up PIC configuration](#) [Some keys aren't working and others are causing trouble!](#) [Stack](#) [Switch](#) [System Requirements](#)

[T](#)

[Thanx](#) [The Author](#) [The big keyboard test](#) [There are many missing or auto repeating keys this can be done](#)

[U](#)

[V](#)

[Value - Configuration](#) [Value - Key](#)

[W](#)

[What is a 'Reset Handler' doing?](#) [What is a PIC?](#) [Why is the PIC configuration so stupid?](#)
