

Informations about the „uAX64 Mini FLEX Gold v2“ Boards

Last changes

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1 Features

The special feature of the "uAX64Mini Flex Gold v2" computer is the compact design and the exchangeable plug-in boards, which are approx. 100x50mm small and can be changed very easily. Thus, it is very easy to achieve a repair in a few seconds by replacing the circuit board.

Due to the compact design, the computer also only takes up a very small space on the desk, and is therefore ideal to remain permanently on the desk.

1.1 Arrangement of the boards

Due to the arrangements of the boards on the module board there is no fear of touching components if attention is paid to the height of the components when mounting them (which could cause an electrical connection to an opposite board). The height should not exceed 1 centimeter. Most of the time only the IC case and rear pins, or plastic connectors and pins touch, which is not a problem electrically. The rear 2 slots have a little more space between the boards.

Important: The interface card board must be inserted into the last slot on the module board at the very back of the module board, as a rear pin connector on the back is led down to the interface board, thus connecting the external ports. For this purpose, an approx. 14 cm long 50 pin ribbon cable with pin connectors is provided.

1.2 Small remote keyboard and small floppy (Pi1541)

To make the 1541 floppy smaller, a Mini Pi1541 can be used. For this purpose a USB power socket was provided as power supply on the interface board to avoid an additional power supply for the floppy.

To make the 1541 floppy smaller, a Mini Pi1541 can be used. For this purpose a USB power socket has been provided on the interface board to avoid an additional power supply for the floppy.

However, before using this USB power socket, it may be necessary to connect the module board and the interface board with two power lines, depending on the power requirements of the connected devices. Two solder pads for 5V and GND are provided for this purpose. Two slightly thicker lines, which can also withstand higher currents, should be used for this purpose.

2 Supply voltage

For the module-board circuit board is intended the use of a 5V drop-down voltage regulator, with a fixed filtered input voltage of 12V. For example the Pololu D36V28F5. Of course any other 5V voltage regulator can be used, but it should be noted that each voltage regulator has different specifications and functions which should be studied carefully before use to determine if it is suitable for the intended application. If a voltage regulator without overcurrent protection/short circuit protection/polarity reversal protection is used, an additional external fuse circuit should be used to prevent possible damage.

In the case of the Pololu D36V28F5, the exact characteristics of the controller can be found on the website <http://pololu.com>. This controller has reverse polarity protection up to 40 V, undervoltage and overvoltage protection at the output, overcurrent protection and short-circuit protection. A thermal shutdown function also helps to prevent damage from overheating, and a soft start function limits the inrush current and allows the output voltage to rise gradually during start-up.

To connect a 12V plug-in power supply unit, a placeholder for a 2.1 mm panel jack is provided (inner conductor +12V, outer conductor earth/GND).

The power switch is a three-pole "toggle switch". It should also be noted that a voltage source in the form of a power supply unit or a battery/rechargeable battery must be able to supply not only the correct voltage but also the necessary current (at least 12V/1A). Car chargers or toy train transformers are not suitable as voltage sources and will lead to damage to any components that may be fitted or to malfunctioning of the circuit board. Before connecting the voltage source, check the correct polarity and the correct polarity of all placed components. If a power supply unit is used as a voltage source, it is imperative that it complies with VDE regulations.

Important: Before ICs are inserted into the sockets of the board, all voltage input pins of each IC should be checked while the power supply is on to ensure that the correct voltage is applied to all ICs and their corresponding pins.

2.1 12V/9V Board voltages

For the 9V/12V voltages, which are provided for the cartridge drive, VIC II and SID chips, 9V and 12V step-up converters are required. For example the U3V16F9 and U3V16F12 from Pololu. It is up to you which regulators are used, if they are suitable for this case.

3 The Boards

3.1 Modul Board

The module board has 6-8 Slots in which you can insert cards. The module board is supplied with 12V via a 2.1mm DIN socket. In the middle is "Plus", outside is "Minus". A module can be inserted vertically into the front expansion ports. The module label faces forwards.

3.2 Interface Board

The interface board, which is screwed under the module board, provides the external connections such as 1541 floppy, joysticks, user port and tape port. This provides space for all connections, which would not be possible with the module board alone.

As already mentioned in point 1.1, the interface board was equipped with an USB power socket, so that no extra power supply is needed on the Pi1541.

Note: before the Interface Board board is connected, the function test should first be carried out without the Interface Board. So first make sure that the module board and the plugged in boards are working and that the C64 responds correctly. Only then the interface board should be connected via the ribbon cable.

3.3 CPU Card

One important note first: With the CPU board and the crystals, care should be taken to ensure that the crystals do not rest on the board when soldering, or at least insulating plates should be used. This is because the quartz housing could possibly come into contact with one of the quartz pins.

If you don't want to use crystals or a MOS 8701 IC, but a 8701 replacement board, you are welcome to do so. Because there is enough space left for this. But you have to make sure that the replacement board does not touch any other board in the opposite slot.

Around the 8701 IC, as well as the two crystals for PAL and NTSC frequencies, you can choose between PAL and NTSC with the jumper (J14).

3.4 RAM Card

This board is deliberately based on the MMU 252535-01 or 251715-01 (for both variants the Color-RAM socket U3 on the video board must be equipped with a 2114 SRAM). The 64-pin IC is almost indestructible (in contrast to the old PLA IC of the old C64 model), and should last longer than all other highly integrated ICs of the C64. There is also a suitable socket for this IC, although this IC is far away from the usual 2.54 pitch.

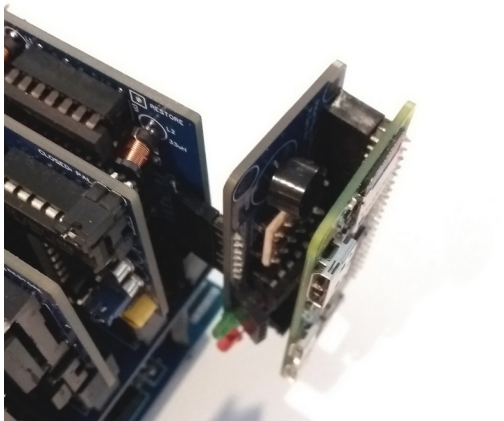
VSP Bug and 41464 DRAM: If you want to avoid the VSP Bug on the uAX64Mini, you can use the usual SRAM adapter boards. The distance to the sockets has been adopted 1:1 so that the adapters fit directly. However, you should not solder the sockets but the adapter board directly, otherwise the height will cause problems.

Important: If a NOS MMU 251715-01 IC is used and there is no C64 image, SRAM should be used instead of DRAM (DRAM adapter board with soldered SRAM ICs).

3.5 Interface Card / Pi1541 Zero

Restore button: As there were not enough pins left on the SLOT bus, the RESTORE button connection from the interface board (keyboard) via PIN "RESTORE" (U7) to MMU pin 9 (Restore) had to be connected by airlift. This can then be connected **"laterally"**.

Pi1541 Zero connector: On the right side there is a pin row which is intended for a separately available Pi1541 Zero adapter board which can take a Pi Zero. If this Pi1541 Zero is plugged in, you have quasi a Mini 1541 "OnBoard".



To ensure that the internal Pi1541 functions reliably, the CIA 6526 (U8) socket should be equipped with a CSG 6526/216A on the rear side if possible. According to one user, MOS 6526/216A should also work, but during my tests I already had problems with MOS 6526/216A chips. Furthermore the following files on the SD-card of the Raspberry pin should be changed.

File: config.txt

kernel_address=0x1f00000

force_turbo=1

boot_delay=1

arm_freq=1100

over_voltage=8

sdram_freq=500

sdram_over_voltage=2

File: options.txt (only for "7406 Only", without extra level shifter board)

invertIECInputs = 1

invertIECOutputs = 1

With this, problematic demos, which even with an original C64 and a Pi1541 drive according to user reports sometimes do not work, worked perfectly in tests.

3.6 Video Card

The video board can be equipped with all VIC II (PAL/NTSC). A stripe fix for the new 85xx VIC-II chips is also available.

3.7 Sound Card

The SIDs can be placed on different or same addresses (pseudo stereo) with a jumper. Especially the 1st SID. So it is now possible to plug multiple sound cards and turn the uAX64 Mini Flex Gold into a music computer ;-)

Before using original SIDs, make sure to double check the voltage jumpers JP1 and JP2. If the wrong voltage is applied, the SID is usually lost forever.

If you want to be on the safe side, you should only use replica SIDs

If a SID is to be placed on both channels (left and right), a 3-PIN female connector with soldered pins can be used.

3.8 Keyboard Remote Card

The USB/BT Keyboard Remote board can be used to connect a normal USB or BT keyboard.

3.9 Change Key Mapping

It is possible to change or reset the key assignment with a few key combinations.

Switch on Mapping Mode: SHIFT + F10 (LED lights up permanently)

Switch off Mapping Mode: SHIFT + F10 (LED is off)

If the mapping mode is active...

... any key can be pressed (except SHIFT and CTRL) to set it as the home key.

... after selecting a key, press and hold the SHIFT key, then press the key whose function is to be executed and release both keys.

Once this has been done, the mapping mode switches off automatically and the data is saved.

Reset key assignment:

CTRL + DEL (mapping mode must be active before: SHIFT + F10)

3.10 Standart Key Assignment

CLR/HOME	=> PRT SCREEN / F12 / F4 (PRT/SCREEN not mapable!)
RUN/STOP	=> ESC
RESTORE	=> BACKSPACE / INSERT
CTRL	=> TAB
COMMODORE (C=)	=> STRG
ARROW LEFT	=> ^ / ~
POUND (£)	=> F6
EQAL (=)	=> F9 / SHIFT 0
ARROW UP	=> F8 / #

4 Bus Analyse Card

This board leads the complete bus to 2 pin rows, whose signals are then very easily available for measurement.

5 Picture Quality

To make it clear what picture quality can be achieved, here are two screenshots with "ODV" Zero Latency S-VIDEO -> HDMI converter and 1080p DELL Touch Monitor (Sharpness 100%). Taken with a Moto G5 smartphone, without any processing. If the picture is worse than seen on the two screenshots, other converters/monitors/cables should be used.

