

Manual and technical specs for Sys-Check II V2.2

- This manual is valid for all Sys-Check V2.2 versions! -

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Introduction of Sys-Check II

The project "Sys-Check" was initiated to primarily enable simple diagnostics of defective or problematic Atari XL/XE computers without the having to open the case. The second goal is to simplify the identification and location of bad components.

Sys-Check (from here on the "II" will be removed, because the first revision never was released to the public) is a PCB which can be connected to either an Atari 600 XL or 800 XL with a PBI connector or to an Atari 65 XE, Atari 800 XE or Atari 130 XE with ECI and cartridge connector. Some 65 XE models don't have an ECI, unfortunately, therefore the Sys-Check can't be used with those.

For normal usage as a diagnostic card, set both DIP switches from the left block with two switches to the "ON" position. On the right block with three switches set No. #1 and #2 to "ON", and the third to the "OFF" position.

Sys-Check also works fine with an Atari 600 XL, but this model should be equipped with 64 KByte main memory, otherwise you will always get errors while testing.

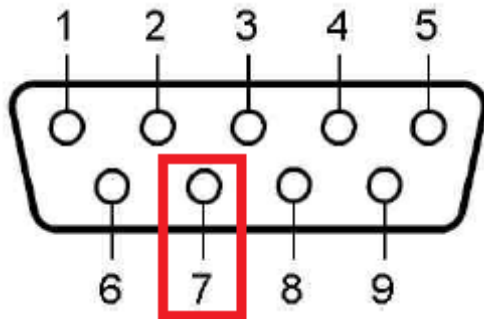
Today there are four versions of Sys-Check V2.2

1. The genuine version named "**Standard**". This PCB can be attached to any Atari XL computer with PBI or any Atari XE computer with ECI bus. Using an Atari XL computer, the Sys-Check V2.2 "Standard" PCB would be attached upright
2. The Sys-Check V2.2 "**BBU**" Edition. This model is the same as above (Sys-Check V2.2 XL/XE Standard) with an additional battery backup function and write-protect switch. **See in the addendum (page 13) for additional infos about the BBU-version!**
3. Sys-Check V2.2 "XL": This version can only be attached to Atari XL computers with a PBI connector. Sys-Check V2.2 XL lies flat behind your Atari XL computer.
4. Sys-Check V2.2 "XE": This version only attaches to Atari XE computers with an ECI bus connector.

All instructions and tips in this manual are valid for all four versions of Sys-Check V2.2. The DIP switches are always arranged in the same, so there should be no misunderstanding.

Usage of Sys-Check

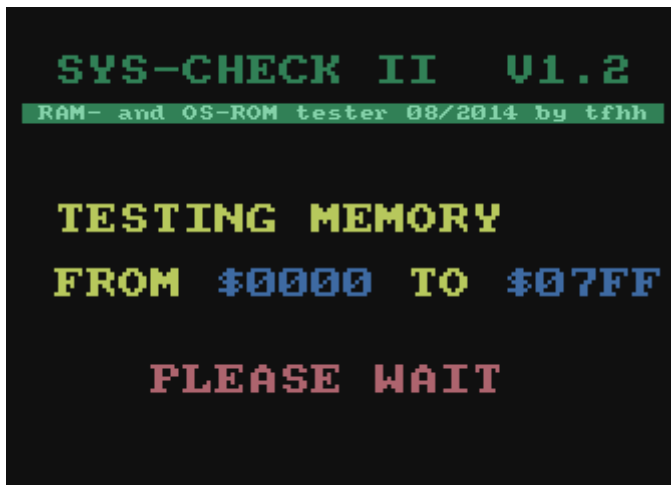
When using Sys-Check with an Atari 800 XL that does not have the "PBI 5 volts patch", the attached blue cable must be inserted to pin 7 of joystick port 2. When using an Atari 600 XL or any XE model this cable **must not** be attached. **The "Sys-Check V2.2 XE" model doesn't have a blue cable.**



(View in front of joystick port 2 from Atari)

To make Sys-Check work properly, please detach any inserted cartridge first. Normally this shouldn't cause any issue, because Sys-Check deactivates internal MMU routings most of the time, but it's better to have the computer without any excess accessories. The internal BASIC ROM is always disabled while Sys-Check is plugged in.

After Sys-Check is inserted into the computer and the computer is powered on, Sys-Check will immediately start with the first test:

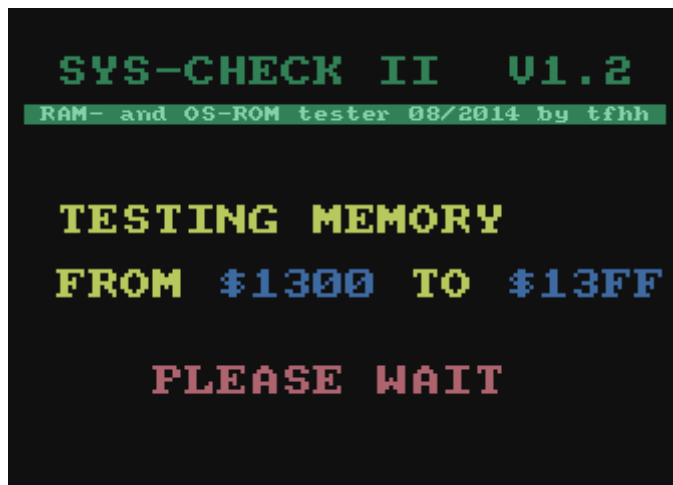


The first 2 KByte of memory will be tested in one pass.

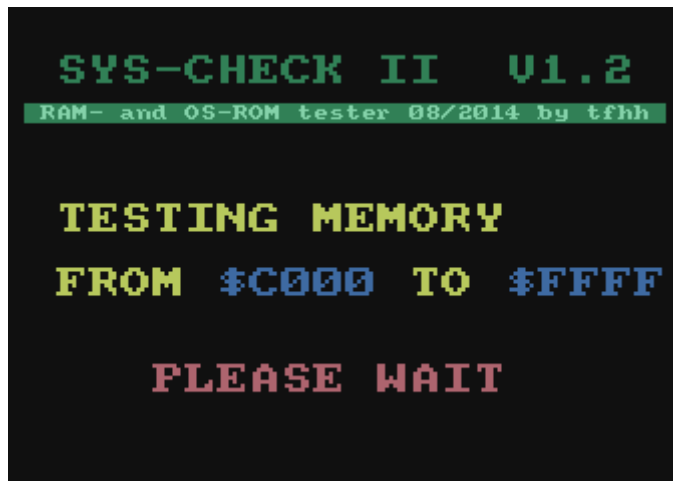
When Sys-Check reaches this point, the following can be assumed:

- CPU, ANTIC and GTIA work mostly fine
- There are no short circuits over address or data lines
- Power supply and internal power distribution seems to be stable

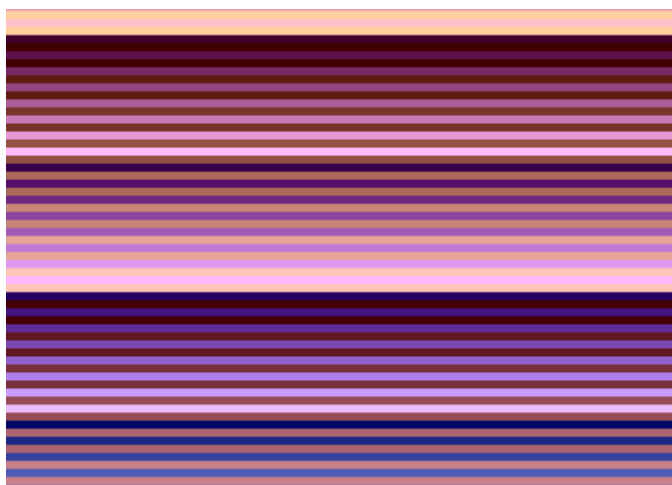
After testing the first 2 KByte of memory, the remainder of the 48 KByte main memory will be tested in pages of 256 bytes each:



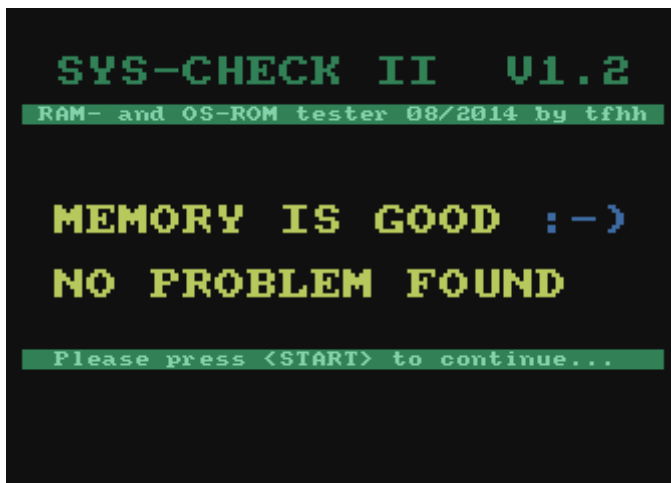
Memory from \$0800 to \$BFFF will be checked in pages. After testing the lower 48 KBytes, the upper 16 KByte under the operating system will also be tested.



While testing this area of memory, the display will be turned off to avoid graphic flickering. To give feedback that the tests are in progress, the border color will cycle in a manner similar to many well known Atari programs...



After successfully testing the upper 16 Kbytes, this screen should appear:

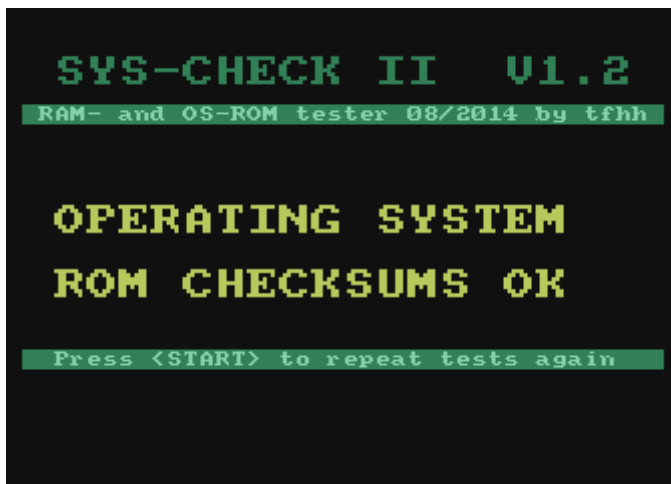


Now press START to continue. You can also press the fire button of a joystick in port 1.

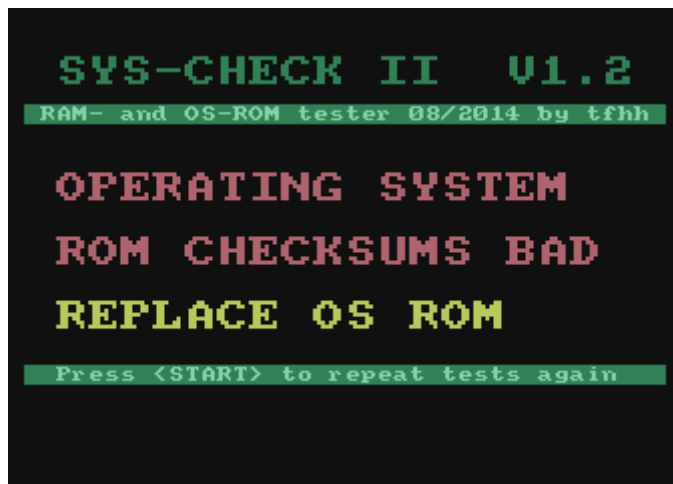
Sys-Check does not require the presence of all the main components to work properly. POKEY and PIA can be detached for the main tests, along with the BASIC and Operating System ROMs. Even the entire memory can be removed, but this isn't very useful for a memory test. ☺

The following test will check the Operating System ROM, so it should be present. Also the PIA must be present. Sys-Check calculates the checksums like the XL/XE OS does in the "Self Test".

The possible results of this test are shown in two screens:



Checksums are OK – fine!



Or...

In this case the saved checksums (or what could be read by the CPU from the ROM or EPROM) doesn't match the calculated one. In some cases (e.g. patched OS) this is normal, because some OS versions don't have correct checksums and/or the checksum routine is disabled or removed. Genuine XL/XE Operating Systems on ROM must (!) pass this test without failure.

Hint: When a computer is dead (no blue "Graphics 0" screen after powering on) it's always a good idea to remove all hardware mods, patched OS versions and so on. If possible, insert a genuine OS ROM from any working XL/XE and remove BASIC ROM to exclude these from being the source of trouble.

Remark: Over many years spent repairing 8-Bit Atari computers, I have noticed some cases where bad OS ROMs are the reason the computer isn't working. Typically a red border screen (NTSC) or brown one (PAL) indicates a failure of memory – memory is so bad, that the stack (\$0100-\$01FF) couldn't be used, so the Operating System reset routines couldn't run properly. If there are enough defective bits of RAM to prevent the Operating System from starting, then the border color changes to black and nothing happens. When there are only "some" defective bits, the Self Test will start, but a red/brown border could also be caused by a non-functional Operating System ROM or EPROM.

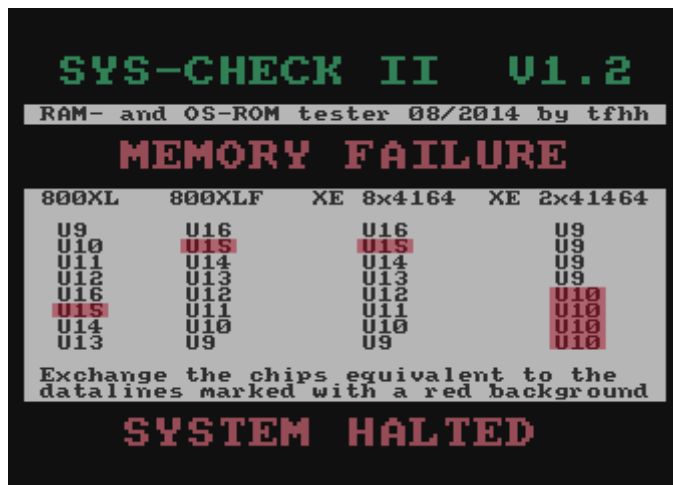
After this test, you can switch off the computer or restart the tests by pressing START (or fire button of joystick 1) again.

Detection of bad memory

An experienced Atari user will quickly recognize when the computer has some memory issues. When the computer is one of the really old series, then it's simple: Just remove the socketed DRAMs chips one by one until the bad one is found. Or change all eight DRAMs with a working set and then replace one by one from the old set to identify the bad chip(s). It's easy and quickly done.

If the computer is an XE or a newer XL, however, the chips are soldered directly into the mainboard. Even if the "Self Test" starts, the display from the Self Test's memory test, which indicates defective RAM, is quite useless because you don't know which one (or more) of the eight DRAMs is defective.

This behavior provides the most powerful reason to use Sys-Check. When Sys-Check detects bad memory, it displays as in the following screen:



This example shows a defective data bit 6. The screen shows exactly which DRAM chip you will need to exchange depending on the computer's model you're investigating. The position and name of the chip are the same as physically on your mainboard.

This failure screen shows up four columns:

Column 1 "800 XL"

This is the mostly common version of the Atari 800 XL computer. It has five chips with 40 pins each. No difference between NTSC or PAL systems.

Column 2 "800 XLF"

This version is the newer 800 XL mainboard with the "Freddie" MMU. It has six chips with 40 pins each and the mainboard is marked with "800 XLF" in the upper right corner near the SIO plug.

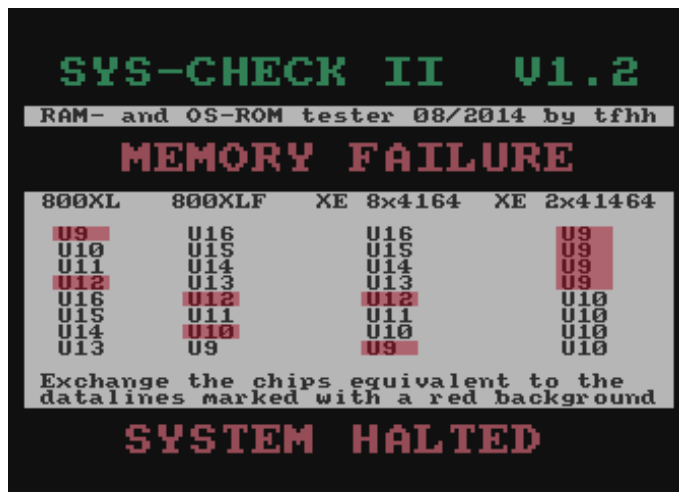
Column 3 "XE 8x4164"

These are the positions of DRAM chips used in the Atari XE with 8 or 16 DRAM chips (marked with "4164" or similar each). The 130 XE model has 16 chips, all others have eight. The main memory (and the one tested by Sys-Check) is always located on the left-most side of the mainboard. Also suitable for Atari 65 XE models.

Column 4 "XE 2x41464"

The last column shows the position of bad memory in the XE models with only 2 or 4 DRAM chips (each marked with 41464 or similar). This DRAM model holds four data bits in one package, so it will always show four defective bits on a failure.

In some cases more than one bit of the data bus lines is faulty. Sys-Check will indicate this, as shown in the next screen:



This example shows two defective bits, 0 and 3. As you can see in the column description, even the chip markings (Uxx) are the same, but not all internal wirings are the same. Data bit 0 is U10 on 800 XLF, but U9 on XE.

This test can also be repeated by pressing START or the fire button of joystick 1.

Now it's time to heat the iron, remove the bad memory and solder in a new one (better to use sockets). In most cases this should fix your Atari completely. ☺

What Sys-Check can't do

Performing magic. There's not enough power in such a small thing. ☺

When there are short-circuits, no system clock is generated, or one of the major chips (MMU, ANTIC, GTIA or the CPU) are faulty, then Sys-Check can't work. Sys-Check isn't a cure-all. But as experience shows, 90% of dead Atari computers have failed due to bad DRAMs or ROMs. The time spent searching for faulty parts can be significantly reduced with Sys-Check.

In some rare cases Sys-Check may mark all bits as faulty, or mark different bits as bad with every restart of the tests. Mostly this occurs with Micron DRAMs. This behavior results in random defective bits and can't be displayed correctly by Sys-Check. When you have the proper equipment (i.e. an oscilloscope), look at the memory address lines A0...A7.

When Sys-Check doesn't work

... some possible reasons:

- CPU, ANTIC, GTIA, MMU or other major parts are very faulty
- Power supply is unstable
- Short circuits
- PBI or ECI/Cartridge connector contacts are coated with dirt, etc.

Atari XL:

Detach the mainboard from the case. Remove all shields and any attached accessories. Use an eraser to clean the PBI contacts. If another mod has added solder to the contacts of the PBI, remove all excess solder (as much as possible). Clean again with the eraser. Remember to clean both sides. ☺

Atari XE:

Use compressed air and/or a vacuum cleaner to clear the spaces between contact guides of the ECI and cartridge connector. If you see some dirt on it, use a piece of cardboard and move it up and down between the contacts – never sideways, as this may damage the contacts.

Please do not use any contact sprays!!!

Don't forget to check the power. A lit up LED on the keyboard is NOT a sign of good power. Check the voltages on the lower right corner of the mainboard – if it's below 4.75 volts, replace the power supply.

Tips for troubleshooting

Sometimes Sys-Check doesn't find a memory failure, but OS ROM will be shown as bad, even if you exchange it with a known good one. Or the memory from \$0000-\$BFFF is always fine, but the memory test from \$C000-\$FFFF indicates multiple errors.

When this behavior continues after changing the OS ROM, then you should also try changing the PIA. You can do another pre-test: Just plug an EPROM with the Atari 400/800 OS ("OLD-OS") into your XL/XE. When the computer starts with the OLD-OS, but not with the XL/XE OS, then the PIA is definitely faulty.

Hint: Sys-Check was tested with a collection of mainboards and very bad memory chips I collected over the years from repairs.

New since V1.3: In the earlier version of this document I noted some problems with Sys-Check occasionally not reporting defective chips. This only happens when using XE computers. After performing many tests, I remembered one important difference between the XL and XE: The XE family doesn't have any pull-up resistors on the eight data lines. When one DRAM chip is missing or a special kind of failure is occurring, then there's a floating situation on the bus – this might cause some wrong outputs. With firmware V1.3, I changed the method of detecting bad bits, eliminating this behavior.

Autopsy of Sys-Check

It was my intention to make Sys-Check easy to solder and generally a simple D.I.Y. project. No SMD parts are used, only THT (through-hole) components. Each component has sufficient space from adjacent parts. The PCB is fully marked with names and positions, so even a beginner should be able to easily assemble his (or her) Sys-Check.

With version V2.2, I switched to using some SMD parts to improve features and give XE users the possibility to use cartridges stacked on Sys-Check. V2.2 is sold preassembled, ready-to-use.

These are the major components of Sys-Check:

512 KByte SRAM:

One 512 KB SRAM is mounted on the Sys-Check PCB. In "memory expansion mode", the 512 KB is used for the "RAMBO" style memory expansion. Otherwise, 64 KB of RAM can be used to substitute the Atari XL/XE's main memory.

27128, 27256, 27512, 27010/271001 EPROM or SST39SF010A Flash:

This ROM, EPROM or Flash holds the Sys-Check firmware and any XL/XE operating-system and will be shown in the memory area from \$C000 through \$FFFF. If a 32 KB (27256) EPROM is used, the Sys-Check firmware must be located at the EPROM's space from \$4000...\$7FFF (all V1.xx versions)!

74HCT123:

Used to generate a shortened PHI2 signal. This is needed to generate stable write signals for SRAM.

74HCT74:

This chip is used as a latch for PB0 and PB7 when writing to \$D301 (Port B of the PIA). This allows both signals of the memory areas to be switched.

74HCT174 or 74HCT273:

This IC holds port bits PB1 through PB6 for PIA emulation of Port B, which is needed for external memory expansion. Only used for memory expansion.

GAL 22V10 "Address Decoder":

This chip decodes the entire 16-bit address bus and generates the clock for load signals to the 74HCT74, 74HCT174/74HCT273 and the "Main" GAL.

GAL 22V10 "Main":

The "glue" chip of Sys-Check. Used for SRAM chip select, write signals, EPROM chip select, mode selection and other signals.

GAL 16V8 "X-RAM":

This logic chip is used for 512 KB external memory expansion in "RAMBO" style.

Functionality of Sys-Check

This chapter is only a short overview about the internal components.

In the normal mode of operation (see description of the DIP switches in the next chapter), Sys-Check controls the entire address range of the Atari computer except the I/O area (\$D000...\$D7FF). The SRAM is used as 64 KByte RAM from \$0000...\$FFFF and the EPROM occupies \$C000...\$FFFF.

Depending on the PIA PB0 and PB7, the address areas are changed in the same manner as the MMU functions. Sys-Check drains the REF-line (Refresh) low to get control of the system. This is the same way expansions such as the TurboFreezer handles it.

Sys-Check's firmware, especially the first part, is programmed to run without even a single byte of functional RAM. Once the first 2 KBytes are successfully tested, some small routines are copied into this area to switch between real RAM on the mainboard and emulated RAM on Sys-Check.

To make this possible, Sys-Check uses a self-defined I/O port at \$D406. This address is unused by ANTIC and is claimed for Sys-Check.

\$D406 map:

Bit 0:	When 0, the SRAM on Sys-Check's PCB is active. When 1, then the RAM on the XL/XE mainboard will be accessed.
Bit 1:	When 0, then the ROM or EPROM on Sys-Check's PCB is selected, otherwise the ROM or EPROM located on the XL/XE mainboard is used.
Bit 2:	Address line A14 to Sys-Check's ROM/EPROM socket (see below).
Bits 3...7:	Reserved - no function at this time.

Sys-Check's firmware actually fits into 16 KBytes, a 27128 EPROM is enough. For future expansion it's possible to use a 27256 EPROM with 32 KBytes. To make future expansions possible, I included some type of bank switching.

Address line A14 can be set or unset by writing to bit 2 of Sys-Check's configuration byte at \$D406. The function of this bit is inverted. Writing zero to bit 2 means that A14 on the ROM/EPROM's socket is logical 1 and vice versa. The reason for doing this is to allow the possibility of using genuine Atari ROMs on Sys-Check's PCB. Some Atari XL/XE operating system ROMs require pin 27 (A14) at high level, otherwise they will not output any data. These types of ROMs use pin 27 as a second chip enable signal, which is high active. The OS ROM pin 27 on all Atari XL's/XE's is connected directly to +5 volts, so Sys-Check's logic sets this pin high until bit 2 of \$D406 is programmed to 1.

Nearly all operating systems clear the I/O area at cold start by writing zeros (except \$D301 in the XL/XE OS), otherwise the OS would hang up the computer, jumping elsewhere.

DIP switch configuration

On Sys-Check's PCB you will find some small switches, called "DIP switches". They have numbers on each block. You will find two blocks, one with two switches ("ROM Select") and the other with three switches ("Mode Select").

The block with two switches selects the operating system or Sys-Check firmware. This block is named "ROM Select". The other block with three switches is named "Mode Select" and selects the operation mode(s) of Sys-Check.

Complimenting the primary purpose of using Sys-Check as a diagnostic card is the bonus ability to use it as an external operating system switcher. If you use a large EPROM or SST39SF010A flash memory, you have the ability to select up to four different operating systems and/or Sys-Check firmware options. The flash memory can be programmed from the Atari itself, so no external programmer or tool is required. To update the flash yourself, I've provided special software.

List of usable memory types:

- ATARI OS-ROM or 27128 EPROM: One XL/XE operating system or one Sys-Check V1.xx firmware.
- 27256 EPROM: One XL/XE operating system or one Sys-Check V1.xx & V2.xx firmware.
- 27512 EPROM: Two XL/XE operating systems or two Sys-Check V1.xx & V2.xx firmware or one of each.
- 27010/271001 EPROM: Four XL/XE operating systems or four Sys-Check V1.xx & V2.xx firmware or three operating systems and one Sys-Check firmware, etc.
- SST39SF010A Flash: As with the 27010 EPROM, but the contents of the memory chip can be changed from the Atari on your own.

When using a genuine Atari XL/XE operating system ROM or a 27128 / 27256 EPROM, the two "ROM Select" switches do not function, but should be set to "OFF" for compatibility with some EPROMs.

When using a 27512 EPROM, DIP switch 1 at the "ROM Select" block selects between both of the possible operating systems, DIP switch 2 at the "ROM Select" block has no function.

If Sys-Check is equipped with a SST39SF010A flash or a 27010/271001 EPROM, up to four operating systems or Sys-Check firmware can be used. Here's the list of how to select them:

DIP 2_1: ON	DIP 2_2: ON	Operating System or Sys-Check Firmware no. 1
DIP 2_1: OFF	DIP 2_2: ON	Operating System or Sys-Check Firmware no. 2
DIP 2_1: ON	DIP 2_2: OFF	Operating System or Sys-Check Firmware no. 3
DIP 2_1: OFF	DIP 2_2: OFF	Operating System or Sys-Check Firmware no. 4

(DIP 2_1: Switch 1 of the "ROM Select" block, DIP 2_2: Switch 2 of the "ROM Select" block)

The included SST39SF010A flash memory is pre-programmed with the following:

Firmware 1	Sys-Check Firmware V1.3
Firmware 2	Genuine Atari XL/XE operating system w/o any patches, version 2 (CO61598B)
Firmware 3	QMEG 4.04
Firmware 4	Genuine Atari XL/XE operating system with Hias' Highspeed-SIO Patch V1.30

Pictures describing the "ROM Select" DIP switches are included at the end of this document.

In order to use Sys-Check as a diagnostic system, set the DIP switches to the following positions:

"ROM Select" block DIP Switch 1: ON

"ROM Select" block DIP Switch 2: ON

"Mode Select" block DIP Switch 1: ON

"Mode Select" block DIP Switch 2: ON

"Mode Select" block DIP Switch 3: OFF

The "Mode Select" block

The second block, with three switches, is called "Mode Select" and is used to set up Sys-Check's operating mode(s). Each switch functions as follows:

DIP 3_1 (first DIP switch of "Mode Select" block):

ON 64 KB main memory is provided by Sys-Check. Internal memory on the Atari PCB is disabled.
OFF Internal memory on Atari PCB is used.

DIP 3_2 (second DIP switch of "Mode Select" block):

ON Operating system is provided by Sys-Check. Internal OS-ROM on the Atari PCB is disabled.
OFF Internal operating system on the Atari PCB is used.

DIP 3_3 (third DIP switch of "Mode Select" block):

ON 512 KB external memory expansion is enabled, only when DIP 3_1 is set to OFF.
OFF Memory expansion is disabled.

Pictures describing the "Mode Select" DIP switches are included at the end of this document.

Examples of typical operation modes:

DIP 3_1: ON
DIP 3_2: ON
DIP 3_3: OFF

Sys-Check is used as a diagnostic tool. Internal memory and operating system on the Atari is disabled and provided by Sys-Check. **Atari-Basic (internal) and any inserted cartridge is disabled.** The 512 KB memory expansion provided by Sys-Check is always disabled.

DIP 3_1: OFF
DIP 3_2: ON
DIP 3_3: OFF

This setting is for using Sys-Check as an external OS switcher / enabler. The computer uses its own memory on the Atari PCB, but the operating system is provided by Sys-Check's PCB. Internal Atari-Basic and any cartridge can be used. The 512 KB memory expansion provided by Sys-Check is **disabled**.

DIP 3_1: OFF
DIP 3_2: ON
DIP 3_3: ON

This setting is for using Sys-Check as an external OS switcher / enabler. The computer uses its own memory on the Atari PCB, but the operating system is provided by Sys-Check. Internal Atari-Basic and any cartridge can be used. The 512 KB memory expansion provided by Sys-Check is **enabled**.

DIP 3_1: OFF
DIP 3_2: OFF
DIP 3_3: OFF

Sys-Check is completely deactivated. All functions are disabled.

Addendum: The Sys-Check V2.2 XL/XE “BBU” Version (BBU = Battery BackUp)

The SysCheck V2.2 XL/XE “BBU” version has all features included like the Standard version plus two additional features:

1. A CR2032 replaceable Lithium battery to keep the RAM’s content when the computer is powered off
2. On the right side a blue slider switch for enable or disable the write access to the RAM on the Sys-Check PCB

The main goal for having a non-volatile memory feature is the usage of Sys-Check as an external memory expansion and a RAM-Disk. For the most common DOS versions there are one or more RAM-Disk utilities available, some DOS have it already included in their code.

Unfortunately, there are some things to mention. Before you put any important data into the RAM-Disk, please read all these hints and do some tests first.

- Several DOS versions respective their RAM-Disk utilities test the existence of extended memory with “destructive” writing to the pages to calculate the amount of additional memory. Such test will corrupt your data with every start-up of the computer. For XDOS this could be set using the configuration. For myDOS special tools exists to generate config files for the RAM-Disk. SDX (SpartaDOS X) also check if the external memory is already initialized by the existence of some “magic bytes”.
- When Sys-Check is used in diagnostic mode, the memory write switch must be set to “enable”. If you attach the BBU version set to diagnostic mode to any computer, please check the setting first, otherwise you might think your Sys-Check is faulty ☹️
- When the memory write switch is set to “disabled” and your RAM-Disk will not be found by the DOS, then the DOS’ RAM-Disk utility do a destructive test. Search for other, better tools or configuration options.
- Not all DOS versions or their RAM-Disk utilities can handle write-protected RAM-Disks. So sometimes the computer may hang or crash if you try to write data to a RAM-Disk served by Sys-Check with the memory write switch set to “disabled”.

Attention: Read if your computer has already any type of internal memory expansion

When the 512 KB "RAMBO" memory expansion is activated on the Sys-Check PCB, it is always the primary memory expansion. When Sys-Check is used on a computer that already has a memory expansion, the internal memory expansion is not used. It is not dependent on which type of internal memory expansion is equipped, Sys-Check is always primary.

The only time an issue can occur is when another external device with an active memory expansion is used together with an activated memory expansion on Sys-Check. At the time of this writing I know of only the Turbo Freezer 2011. Please don't activate the memory expansion on both devices at the same time, only on one device (Sys-Check or Turbo Freezer).

The same goes for the OLD-OS setting of the Turbo Freezer 2011 (and 2005, too!). It's not possible to use this feature with Sys-Check.

Ideas, Complaints, Wishes, Thoughts

My intentions when creating Sys-Check were based on innumerable XL/XE computers with defective memory – mostly with the "evil" Micron DRAMs. I often dealt with directly soldered DRAM chips, and using the piggy-pack method (installing a functional DRAM over each DRAM on the mainboard one by one and test if the computer boots) was not always successful.

So perhaps you have a great idea? Something is wrong? You want new features?

Please share your idea or comment with me. If possible, I will include it in one of the next firmware versions or correct something wrong. Please give feedback – that's the only way to fix issues or improve it.

PLEASE only use email to contact me. I'm not regularly in forums such as AtariAge, so information could get lost. Just drop me an email at tf_hh@gmx.de – Use "ATARI" within the subject.

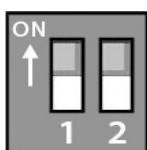
Last words

I want to say "Thank you!" to the following of the Atari community who helped me to improve this manual:

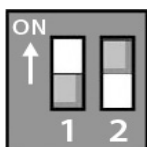
- Patrick C. for proofreading and revising the whole manual and several corrections of English language fails done by me
- Jerome D. for the nice alternative DIP-Switch settings summary at page 17

Quick reference guide for setting the DIP-switches on Sys-Check

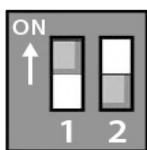
Left block ("ROM Select") with two DIP-switches



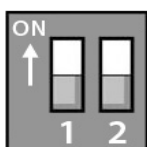
Sys-Check Diagnostic Firmware



Genuine Atari XL/XE operating system w/o any patches, version 2 (CO61598B)



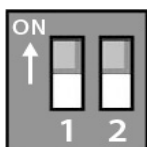
QMEG 4.04

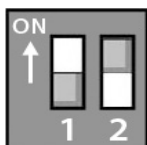


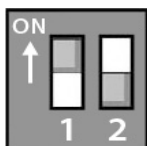
Genuine Atari XL/XE operating system with Hias' Highspeed-SIO Patch V1.30

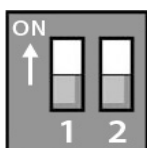
Attention: The settings above are only valid until you use the pre-programmed content, of course 😊

You can print out this page and fill the lines below with the operating systems or Sys-Check versions you've programmed, if you want.



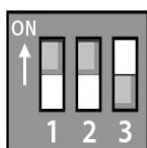




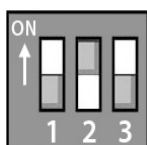


Quick reference guide for setting the DIP-switches on Sys-Check

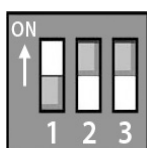
Right block ("Mode Select") with three DIP-switches



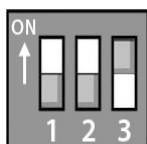
Sys-Check is used as a diagnostic tool. Internal memory and operating system on the Atari are disabled and provided by Sys-Check. **Atari-Basic (internal) and any inserted cartridge is disabled.** The 512 KB memory expansion provided by Sys-Check is always **disabled**.



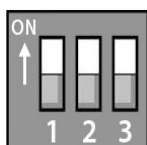
This setting is for using Sys-Check as an external OS switcher / enabler. The computer uses its own memory on the Atari PCB, but the operating system is provided by Sys-Check's PCB. Internal Atari-Basic and any cartridge can be used. The 512 KB memory expansion provided by Sys-Check is **disabled**.



This setting is for using Sys-Check as an external OS switcher / enabler. The computer uses its own memory on the Atari PCB, but the operating system is provided by Sys-Check's PCB. Internal Atari-Basic and any cartridge can be used. The 512 KB memory expansion provided by Sys-Check is **enabled**.



Using this setting enables only the 512 KB memory expansion. RAM and ROM are used from inside the computer, Sys-Check provides only external memory. Internal Atari-Basic and any cartridge can be used.



Sys-Check is completely deactivated. All functions are disabled.

ROM SELECT	Factory-default OS	My customised OS setting
	Sys-Check Diagnostic Firmware	
	Genuine Atari XL/XE operating system w/o any patches, version 2 (CO61598B)	
	QMEG 4.04	
	Genuine Atari XL/XE operating system with Hias' Highspeed-SIO Patch V1.30	

MODE SELECT	Use	OS from...	64K RAM from...	ATARI Basic	Cartridge	512K RAM
	Diagnostic tool	Sys-Check Card	Sys-Check Card	X	X	X
	Sys-Check as external OS	Sys-Check Card	ATARI	✓	✓	X
	Sys-Check as external OS + 512 RAM	Sys-Check Card	ATARI	✓	✓	✓
	512 RAM	ATARI	ATARI	✓	✓	✓
	Sys-Check Card deactivated	ATARI	ATARI	✓	✓	X

This summary is made by Jerom D. – thank you very much for this fine work!