ZX Evolution

«Test&Service» firmware/configuration



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1 Description

This firmware/configuration intend for checking proper functionality of ZXEvolution hardware components.

T&S configuration use resource of ATMEGA128 (D4) and EP1K50 (D2) chips. Information view on screen (TV or VGA) and output to RS-232 port (115200 bps, 8 bit, without parity, without transmission control). Control by PS/2 keyboard.

Configuration adapted for default ZXEvolution boards settings (Q2 is 11,0592 MHz, and ICS501 [D9] set 28 MHz output frequency [J2 and J3 opened]).

2 Install

Test&Service (T&S) configuration install like other configurations via ZXEvolution bootloader.

3 Start

1) T&S started at power switch on without wait to press any keys like SoftReset.

Output message to RS-232 port on start:

ZX Evolution Test&Service (YYMMDD)

2) On first T&S configuration try to check pins state of ATMEGA128. Not all pins can to checked. Please not press ZX-Keyboards keys and not use joystick (if they plugged).

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Output message to RS-232 port:
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ATMEGA128 pins check... No problems found.

3) Switch on main power, if not switched on yet (using ATX power supply).

Output message to RS-232 port:

Status of POWERGOOD=0, VCC5=0 ATX power up...

After switched on main power of ATX power unit:

Status of POWERGOOD=1, VCC5=1

4) Load and configure FPGA

Output message to RS-232 port:

Set FPGA configuration... Done.

On this step synchronization signals come to screen, but information not view on screen.

5) Check exchanging data with FPGA

Output message to RS-232 port:

FPGA data exchange test... Ok.

6) Detect and initialize PS/2 keyboard

Output message to RS-232 port:

 $\mathsf{PS}/\mathsf{2}$ keyboard check... FF FA AA F2 FA AB 83 F0 FA 02 FA F3 FA 00 FA

ZX Evolution. «Test&Service» firmware/configuration.

7) Main menu show on screen. You can select tests via PS/2 keyboard.



4 Control

Main menu and some other testes control by next keys:

<Up>, <Down> - select items;

<Enter> - select or confirm «Yes»;

<ESC> - cancel, exit or confirm «No».

Keys, whose work only on main menu:

<ScrollLock> - switch screen mode «TV/VGA» (Led ScrollLock light on «VGA» mode);

<CapsLock> - select interface language (russian/english).

 $\langle F1 \rangle$ - help.

Video mode and interface language saved in eeprom ATMEGA128 and stored till next firmware loading.

On default: video mode - «TV», language — english (for eng version of firmware).

5 DRAM test

After showing main menu and later started dynamic memory test. It work independently from other test. All dynamic memory filled by quasyrandom sequence and compare with them on every loop. Result showed on DRAM test frame on main menu.

Counter hold on 65535 (after approximately 11 hour). But testing DRAM not stopped.

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6 "PS/2 keyboard" test

Press keyboards keys and them codes show on screen.

Bytes from PS/2 keyboard view on "RAW data" output string. Same data duplicate to RS-232 port. You must to press ESC key three times for exit from this test.



7 "ZX-keyboard end etc" test

If you plug ZX-keyboard (mechanical keyboard), then you can test it by using this menu item. Also you can test joystick and system buttons (SoftReset, NMI[TurboKey]).



8 "Mouse" test

PS/2 mouse test support three-buttons with wheel PS/2 mouses. Received data from mouses duplicate to RS-232 port.

View next sequences:

- Detecting mouse sequence;
- Customization sequence (set mouse resolution or other parameters);
- Lets go! last sequence got from mouse.

FF FA AA 00 Customization	
F3 FA C8 FA F3 FA 64 FA F3 FA 5	50 FA
E8 FA 02 FA E6 FA F3 FA 64 FA F Let's go!	F4 FA
08 00 00 00	
	LMR
	libee1 = 0
N	× - 107
	Y = 158

9 "BEEP/TAPEOUT/COVOX" test

Test generate frequency on sound output.

<Up> - increase frequency, <Down> - decrease frequency.



10 "Video" test

This test content some static images/tables for tuning video out. <ESC> - exit from test, any other – next image.

- 1) Pixelwide chessboard.
- 2) Chessboard
- 3) "Classic" PAL-tuning table
- 4) Base-colors bars
- 5) Mixed base-colors bars
- 6) Base-colors pixelwide crosses

11 "RS-232" test

RS-232 loopback test (all received data send back).

Connect ZX Evolution to other computer by null-modem cable. Start on host diagnostic software (for example - <u>http://www.zelax.ru/bfiles/soft/testcom.zip</u>).

Test show on screen next information:

Last sec – bytes per last second (on right – seconds after test starts and speed for this time);

RxBuff and TxBuff – state of receive and transmit buffers;

RTS and CTS – state of transmission control signals.

<Space> key- reset buffers and information.

Null-modem cable scheme (5-wired):

X1				X2
Цепь				Цепь
RXD	2		2	RXD
TXD	3	$\vdash \frown \vdash$	3	TXD
GND	5		5	GND
RTS	7		7	RTS
CTS	8		8	CTS

Signal RTS set on 20 bytes before receive buffer end. If receive buffer full then received bytes lost. Seconds counter reset on 65535 (18 hours 12 minutes) and reset statistic information.

12 "SD/MMC diagnostic"

Show information about SD (or MMC) memory card on screen and duplicate it to RS-232 port.

If memory card formatted FAT12/16/32 and file TESTFILE.BIN has in root directory, then calculated CRC for them.

You can get detailed report of your memory card if you set checkbox «Detailed log to RS-232».

13 "Write Flash-ROM"

Flash-ROM utility. Here you can write or update flash-ROM.

ZX Evolution Test&Service (160104)						
Arxit Retrieve all Erase chip Add job Execute jobs Brhip: M29F040 CRC: 558A76A8 SDcard: FAT32 Pre054a Zxe054d Zxe055b Zxe055b Zxe055c Zxe005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev05c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev005c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev05c Zxev0		rom 524288 2 rom 524288 1 rom 524288 2 rom 524288 2 rom 524288 1 rom 524288 1 rom 524288 2 rom 524288 2 rom 524288 2 rom 524288 0 2 rom 524288 0	0.12.13 15:40 7.02.14 17:32 9.03.14 17:59 3.04.14 18:27 5.08.14 19:32 1.01.15 23:19 4.09.15 17:51 4.01.12 22:55 7.05.12 13:23 4.12.12 21:42 8.12.12 19:06			
C empty * * empty * ZX Basic 48 ZX Basic 48 PROFKA ZX Basic 48 RST_08 ZX Basic 48 ZX Basic 48	* empty * ZX Basic 48 TRD612 TR-DOS PROFKA EVODOS ADDONS EVODOS	* empty * ZX Basic 128 ZX Basic 128 ZX Basic 128 PROFKA * empty * ADDON1 ZX Basic 128	* empty * ZX Basic 48 AlCoGLUK pen PROFKA PROFKA ATMCPM ADDON2 HEGLUK			
http://www.NedoPC.com/						

Frame «A»: Main menu of Flash-ROM utility.

«Retrieve all» - reset jobs, re-read content of Flash-ROM, init SD card and read root directory.

«Erase chip» - add "Erase chip" job. Flash-ROM will cleaned before any other jobs.

«Add job» - select file and part of Flash-ROM to write.

«Execute jobs» - start to write Flash-ROM.

Frame «B»: information about Flash-ROM type, control sum of chips data (CRC), type of FAT on SD card. Also messages about writing shown here.

Frame «C»: map of content Flash-ROM splits on 16kb pages.

Page 0 (#00000#03FFF)	Page 1 (#04000#07FFF)	Page 2 (#08000#0BFFF)	Page 3 (#0C000#0FFFF)
Page 4 (#10000#13FFF)	Page 5 (#14000#17FFF)	Page 6 (#18000#1BFFF)	Page 7 (#1C000#1FFFF)
Page 8 (#20000#23FFF)	Page 9 (#24000#27FFF)	Page 10 (#28000#2BFFF)	Page 11 (#2C000#2FFFF)
Page 12 (#30000#33FFF)	Page 13 (#34000#37FFF)	Page 14 (#38000#3BFFF)	Page 15 (#3C000#3FFFF)
Page 16 (#40000#43FFF)	Page 17 (#44000#47FFF)	Page 18 (#48000#4BFFF)	Page 19 (#4C000#4FFFF)
Page 20 (#50000#53FFF)	Page 21 (#54000#57FFF)	Page 22 (#58000#5BFFF)	Page 23 (#5C000#5FFFF)
Page 24 (#60000#63FFF)	Page 25 (#64000#67FFF)	Page 26 (#68000#6BFFF)	Page 27 (#6C000#6FFFF)
Page 28 (#70000#73FFF)	Page 29 (#74000#77FFF)	Page 30 (#78000#7BFFF)	Page 31 (#7C000#7FFFF)

Status of pages:

«empty» - empty, page filled by #FF.

«????» - non-empty, but utility can't detect type of content.

Frame «D»: SD files viewer. Shown directories and files with .rom/.bin extension and size from 1 to 524288 bytes. Only short names (8.3).

13.1 Additional.

SD (or MMC) memory card must formatted to FAT12, FAT16 or FAT32.

Files must had extension .rom or .bin and size from 1 to 524288 bytes. Writing gone by 512 bytes blocks. If file not align to 512 bytes, then writed data fill by SD cards sectors data.

Supported Flash-ROM chips: M29F040, AM29F040 (and compatible). Flash-ROM data erased by 64Kb blocks or full chip erasing.

Writes without erase data is not support.

13.2 Example 1.

Flash-ROM already content some data. Try to write data from small file (<=16Kb).

ZX EV	olution Tes	t&Service (14	0302)	ZX E	volution Tes	tåService (14	0302)
Выход Воё снова Стереть мисх. Добав.задание Выполнить	254 a2 bios_1~1 glukpen prn_prob test2246	<pre></pre>	9.04.11 18:29 9.03.11 21:57 8.02.11 23:15 3.07.02 18:16 1.03.06 00:00 4.04.11 00:58 8.09.07 00:00	Выход Воё снова Стереть мисх Довав задани Выполнить	254 a2 bios_1*1 glukpen prn_prob testzx48	(DIR) 2 rom 524288 1 rom 524288 2 rom 65536 1 rom 16384 1 rom 524288 2 rom 2048 1	9.04.11 18:29 9.03.11 21:57 8.02.11 23:15 3.07.02 18:16 1.03.08 00:00 4.04.11 00:58 8.09.07 00:00
CRC: C7502817 SDcard: FAT32	xbios1"1 zxevo_"1	rom 131072 13 rom 524288 20	4.02.98 00:00 8.09.07 00:00 4.03.11 23:40	CRC: C750281 SDcard: FAT3	7 xbios1~1 2 zxevo_~1	rom 131072 1 rom 524288 2	4.03.11 23:40
???? T	R-DOS	ZX Basic 128	ZX Basic 48	????	TR-DOS	ZX Basic 128	ZX Basic 48
* empty *	* empty *	* empty *	* empty *	* empty *	* empty *	* empty *	* empty *
ZX Basic 48 T	RD612	ZX Basic 128	AlCoGLUK pen	ZX Basic 48	TRD612	ZX Basic 128	AlCoGLUK pen
ZX Basic 48 T	R-DOS	ZX Basic 128	PROFKA	ZX Basic 48	TR-DOS	ZX Basic 128	PROFKA
PROFKA P	ROFKA	PROFKA	PROFKA	PROFKA	PROFKA	PROFKA	PROFKA
ZX Basic 48 E	VODOS	MSXDOS	ATMCPM	ZX Basic 48	EVODOS	MSXDOS	ATMCPM
RST_08 A	DDONS	ADDON1	ADDON2	RST_08	ADDONS	ADDON1	ADDON2
ZX Basic 48 E	VODOS	ZX Basic 128	HEGLUK	ZX Basic 48	EVODOS	ZX Basic 128	HEGLUK

Select «Add job». Select file. Select page.

????	TR-DOS	ZX Basic 128	ZX Basic 48
* empty *	∗empty ∗	* empty *	* empty *
ZX Basic 48	TRD612	ZX Basic 128	AlCoGLUK pen
ZX Basic 48	TR-DOS	ZX Basic 128	PROFKA
PROFKA	PROFKA	PROFKA	PROFKA
ZX Basic 48	EVODOS	MSXDOS	ATMCPM
RST_08	ADDONS	ADDON1	ADDON2
empty	empty	testzx48 rom	empty

Sets next job:

1) erase pages 28...31;

2) write Flash-ROM on internal address #78000 2048 bytes from file TESTZX48.ROM.

13.3 Example 2.

Write set of four pages, but to second page write data from other file.

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ZX EVO	lution Test	&Service (140	302)	ZX EVO	lution Test	tåService (14	0302)
Выход Всё снова Стереть м/сх. Добав.задание Выполнить Сhip: M29F040 CRC: 504BF849 SDCard: FAT32	254 a2 bios_1"1 pent_v22 prn_prob trd504tm xbios1"1 zxevo_"1	<pre></pre>	0.04.11 18:29 0.03.11 21:57 3.02.11 23:15 3.07.02 18:15 0.09.08 00:00 4.04.11 00:58 5.09.07 00:00 4.12.98 00:00 5.09.07 00:00 4.12.98 00:00 4.03.11 23:40	Выход Воё снова Стереть м/сх. Довав.задание Выполнить Chip: M29F040 CRC: 504BF849 SDcard: FAT32	254 a2 bios_1~1 pent_v22 prn_prob testzx48 trd504tm xbios1~1 zxevo_~1	<pre></pre>	3.04.11 18:29 9.03.11 21:57 8.02.11 23:15 3.07.02 18:16 1.09.08 00:00 4.04.11 00:58 8.09.07 00:00 4.12.98 00:00 5.09.07 00:00 4.03.11 23:40
pent_v22 rom pe	nt_v22_rom	pent_v22_rom	pent_v22 rom	pent_v22 rom per	nt_v22_rom	pent_v22_rom	pent_v22_rom
empty	empty	empty	empty	empty	empty	empty	empty
empty	empty	empty	empty	empty	empty	empty	empty
empty	empty	empty	empty	empty	empty	empty	empty
empty	empty	empty	empty	empty	empty	empty	empty
empty	empty	empty	empty	empty	empty	empty	empty
empty	empty	empty	empty	empty	empty	empty	empty
empty	emptý	empty	empty	empty	empty	empty	empty
ь	ttp://www.N	ledoPC.com/		bt	tp://www.h	NedoPC.com/	

Select «Add job». Select file PENT_V22.ROM. Select pages 0...3.

Select «Add job». Select file TRD504TM.ROM. Select page 1.

pent_v22 rom	trd504tm rom	pent_v22 rom	pent_v22 rom
empty	empty	empty	empty
empty	empty	empty	empty
empty	empty	empty	empty
empty	empty	empty	empty
empty	empty	empty	empty
empty	empty	empty	empty
empty	empty	empty	empty

Sets next job:

1) erase pages 0...3;

2) write Flash-ROM on internal address #00000 16384 bytes from file PENT_V22.ROM (from position #00000).

3) write Flash-ROM on internal address #04000 16384 bytes from file TRD504TM.ROM (from position #00000).

4) write Flash-ROM on internal address #08000 16384 bytes from file PENT_V22.ROM (from position #08000).

5) write Flash-ROM on internal address #0C000 16384 bytes from file PENT_V22.ROM (from position #0C000).