Test Plan

for

MINI-MAX/AVR

Revision: 1.01

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1. Introduction.

The test plan allows to test most sub-systems of Mini-Max/AVR board:

- POWER circuit;
- ATMEGA2560 central processor unit;
- RESET circuit;
- BOOT circuit;
- PROGRAM connector;
- BOOT loader;
- 3 EXPANSION connectors;
- LCD connector;
- KEYPAD connector;
- JTAG connector;
- ANALOG terminals;
- UART0;
- UART1.

The complete hardware test setup consists of 3 parts:
- MINI-MAX/AVR board;
- MICROTRAK board with a pre-installed 8051 IO module;
- 6VDC power supply.

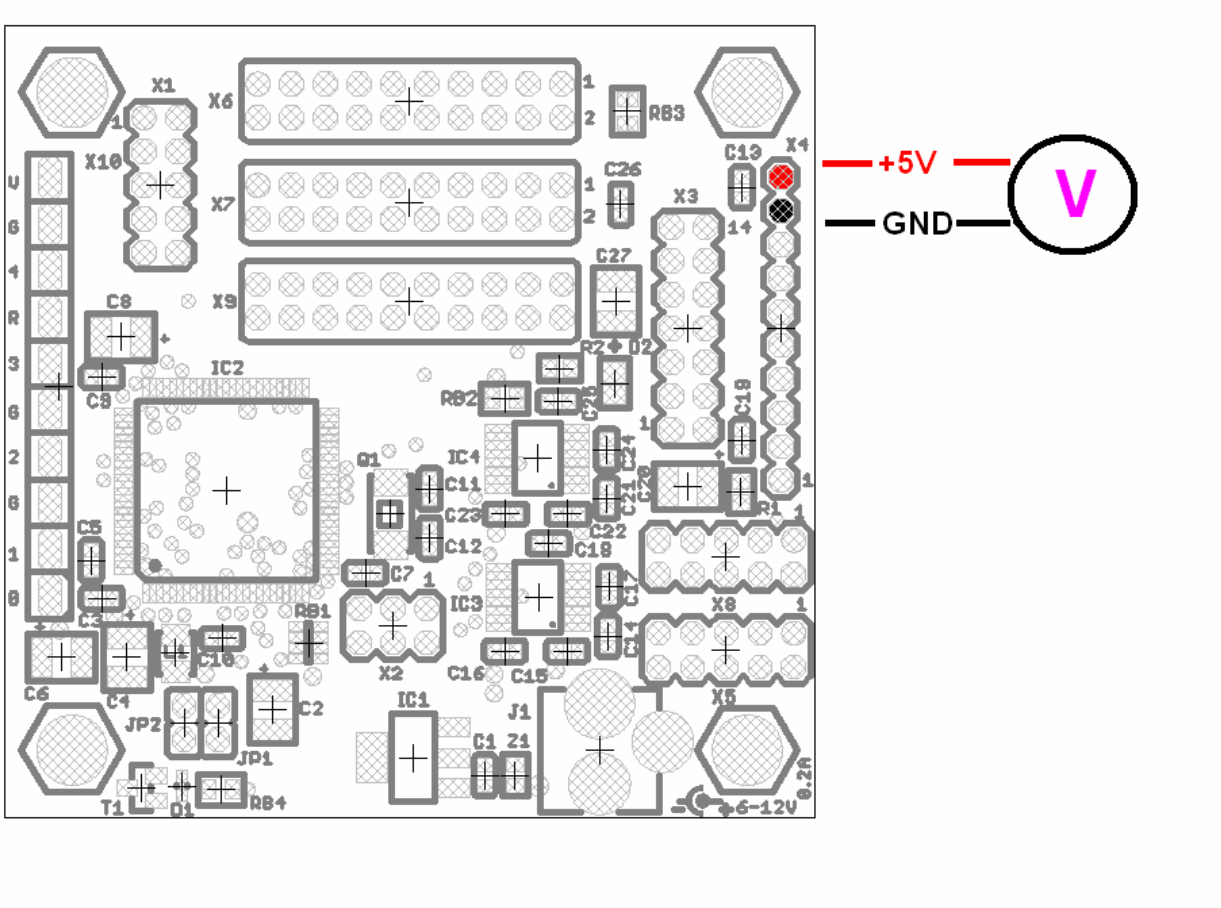
The complete firmware test setup consists of 2 parts.
BiPOM ATMEGA2560 bootloader is a piece of software that runs on the MINI-MAX/AVR to facilitate downloading to the FLASH/EEPROM memory of ATMEGA2560 microcontroller on the MINI-MAX/AVR board. The bootloader communicates with ATMEL AVR Studio (www.atmel.com) running on a PC through the serial port. Through the bootloader, the MINI-MAX/AVR appears AVR Studio as the ATMEL STK500 board.
BiPOM ATMEGA2560 bootloader is the 1st part of the test firmware that has to be downloaded to the board. The 2nd part is BIPOM MINI-MAX/AVR DIAGNOSTIC UTILITY.

2. Software setup.

2.1. Download and install AVR Studio from
http://www.atmel.com/dyn/products/tools_card.asp?tool_id=2725
2.2 Download and install ARM7 Development System from
http://www.bipom.com/armdev_down.php
2.3. Download http://www.bipom.com/files/mmavr/mmavr_test_plan.zip
and unzip to c:\mmavr_test_plan

3. Hardware setup.

3.1. Power the blank MINI-MAX /AVR board from 6VDC power supply.
The current consumption should be around 50mA. D2 (RED LED) should switch ON.
Please check 5VDC on the board according to the picture below.

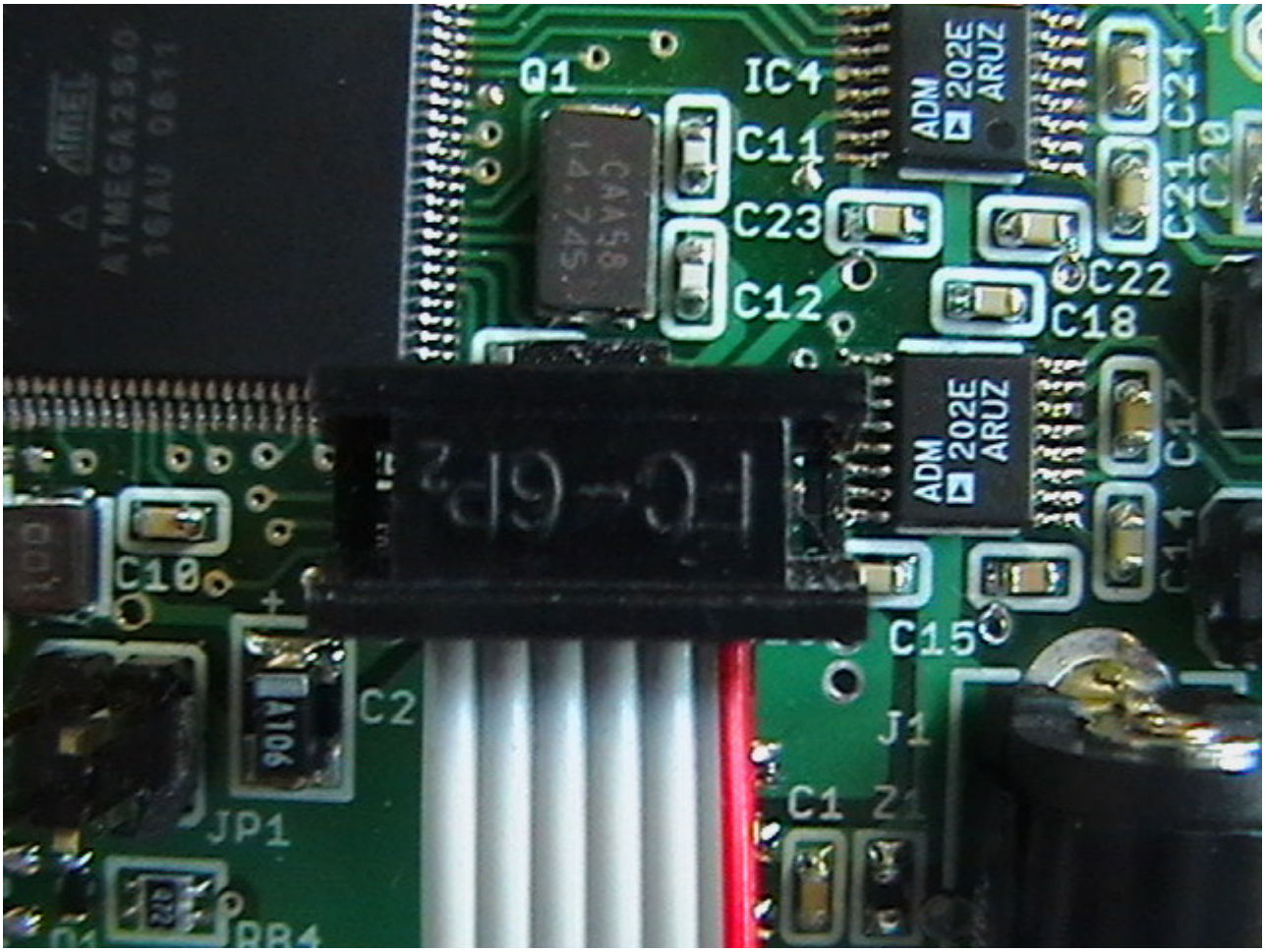


4. Firmware Setup.

To get started with the board it is necessary to download the firmware. Any AVR programmer can be used for that purpose.

Let's review how to do that using AVRISP (or AVRISP2):

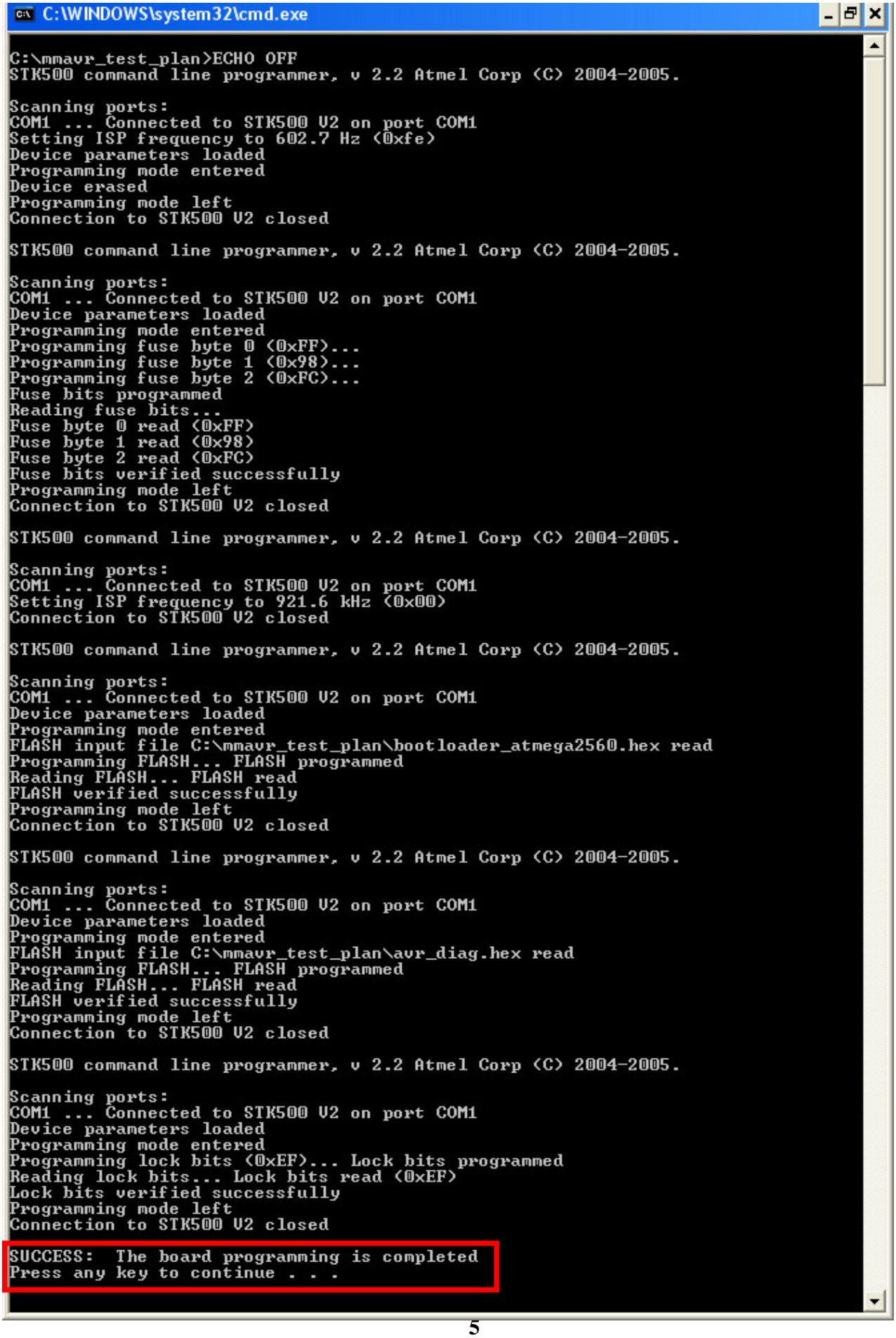
4.1. Connect the 6-pin header of AVRISP to X2 connector of MINI-MAX/AVR board (AVRISP comes with both 6-pin and 10-pin headers so if yours is set to 10-pin, header, change this to 6-pin header).



4.2. Connect your AVRISP to your PC's COM port.

4.3. Power the MINI-MAX/AVR board. AVRISP will be powered from the MINI-MAX/AVR board.

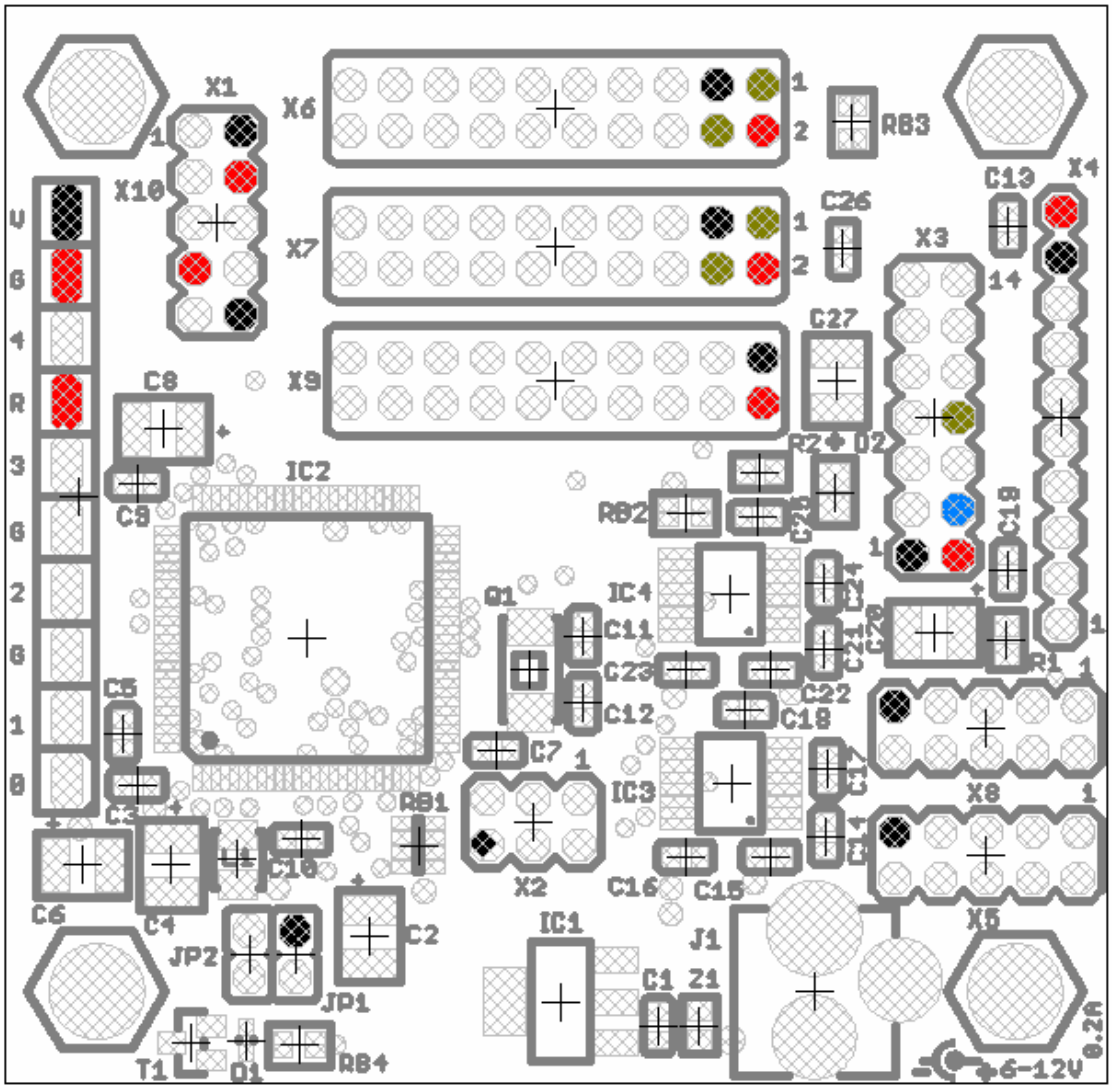
4.4. Run start.bat in c:\mmavr_test_plan directory. It will program and verify the board in a short time. See the picture below.
It is very important to have "SUCCESS: The board programming is completed" message at the end. If there is no "SUCCESS: …" message it means the board is defective.


C:\WINDOWS\system32\cmd.exe
C:\mmavr_test_plan>ECHO OFF
STK500 command line programmer, v 2.2 Atmel Corp (C) 2004-2005.
Scanning ports:
COM1 ... Connected to STK500 V2 on port COM1
Setting ISP frequency to 602.7 Hz (0xfe)
Device parameters loaded
Programming mode entered
Device erased
Programming mode left
Connection to STK500 V2 closed
STK500 command line programmer, v 2.2 Atmel Corp (C) 2004-2005.
Scanning ports:
COM1 ... Connected to STK500 V2 on port COM1
Device parameters loaded
Programming mode entered
Programming fuse byte 0 (0xFF)...
Programming fuse byte 1 (0x98)...
Programming fuse byte 2 (0xFC)...
Fuse bits programmed
Reading fuse bits...
Fuse byte 0 read (0xFF)
Fuse byte 1 read (0x98)
Fuse byte 2 read (0xFC)
Fuse bits verified successfully
Programming mode left
Connection to STK500 V2 closed
STK500 command line programmer, v 2.2 Atmel Corp (C) 2004-2005.
Scanning ports:
COM1 ... Connected to STK500 V2 on port COM1
Setting ISP frequency to 921.6 kHz (0x00)
Connection to STK500 V2 closed
STK500 command line programmer, v 2.2 Atmel Corp (C) 2004-2005.
Scanning ports:
COM1 ... Connected to STK500 V2 on port COM1
Device parameters loaded
Programming mode entered
FLASH input file C:\mmavr_test_plan\bootloader_atmega2560.hex read
Programming FLASH... FLASH programmed
Reading FLASH... FLASH read
FLASH verified successfully
Programming mode left
Connection to STK500 V2 closed
STK500 command line programmer, v 2.2 Atmel Corp (C) 2004-2005.
Scanning ports:
COM1 ... Connected to STK500 V2 on port COM1
Device parameters loaded
Programming mode entered
FLASH input file C:\mmavr_test_plan\avr_diag.hex read
Programming FLASH... FLASH programmed
Reading FLASH... FLASH read
FLASH verified successfully
Programming mode left
Connection to STK500 V2 closed
STK500 command line programmer, v 2.2 Atmel Corp (C) 2004-2005.
Scanning ports:
COM1 ... Connected to STK500 V2 on port COM1
Device parameters loaded
Programming mode entered
Programming lock bits (0xEF)... Lock bits programmed
Reading lock bits... Lock bits read (0xEF)
Lock bits verified successfully
Programming mode left
Connection to STK500 V2 closed
SUCCESS: The board programming is completed
Press any key to continue . . .

5. Test 1.

5.1. JP1 jumper is open. JP2 jumper is closed.

5.2. Power from the MINI-MAX/AVR board and check all voltages according to the picture below.



+5V

GND

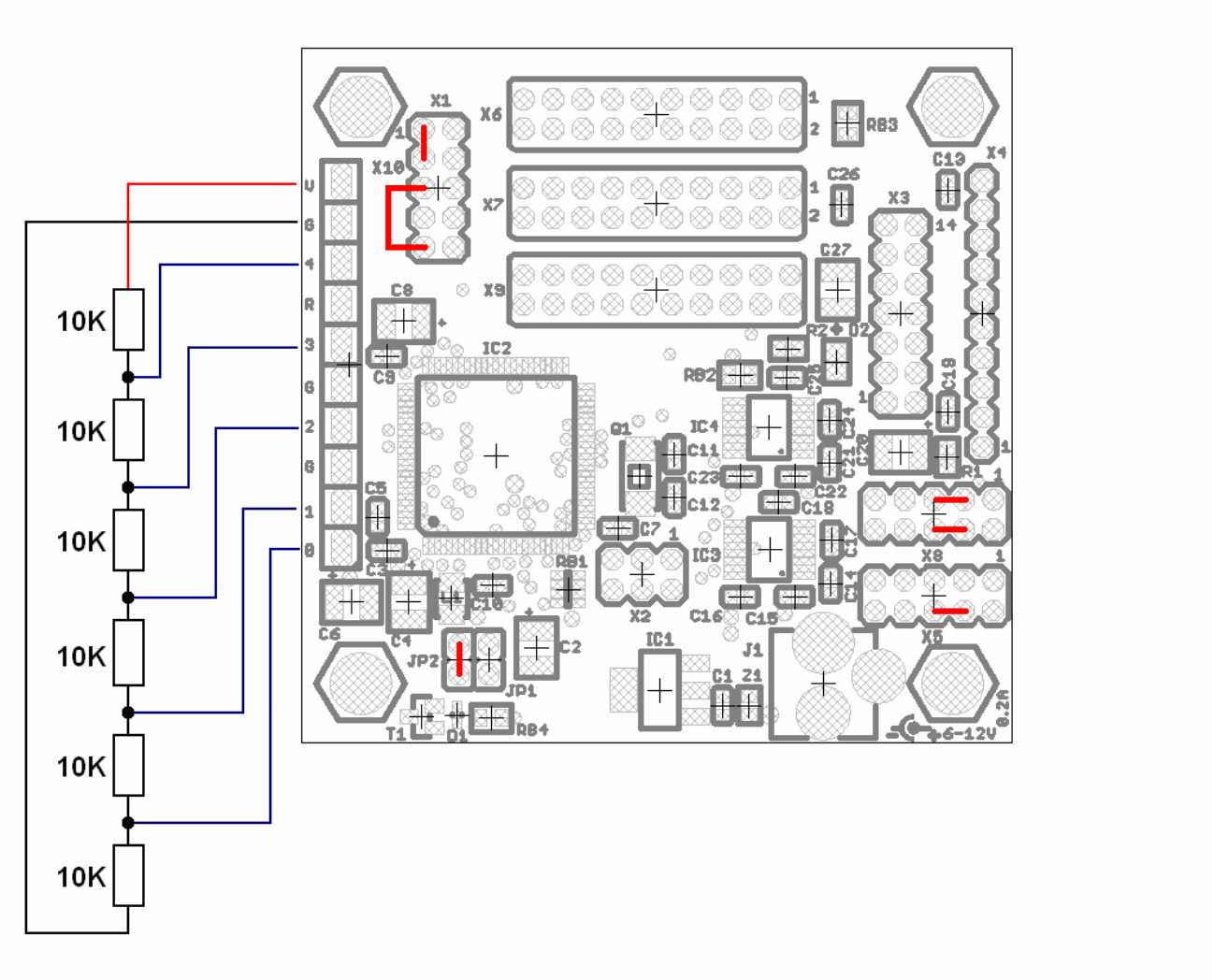
+1V

CUT PIN

5.3. Disconnect the power

6. Test 2.

6.1. Make all external connections to Mini-Max/AVR board according to the picture below.

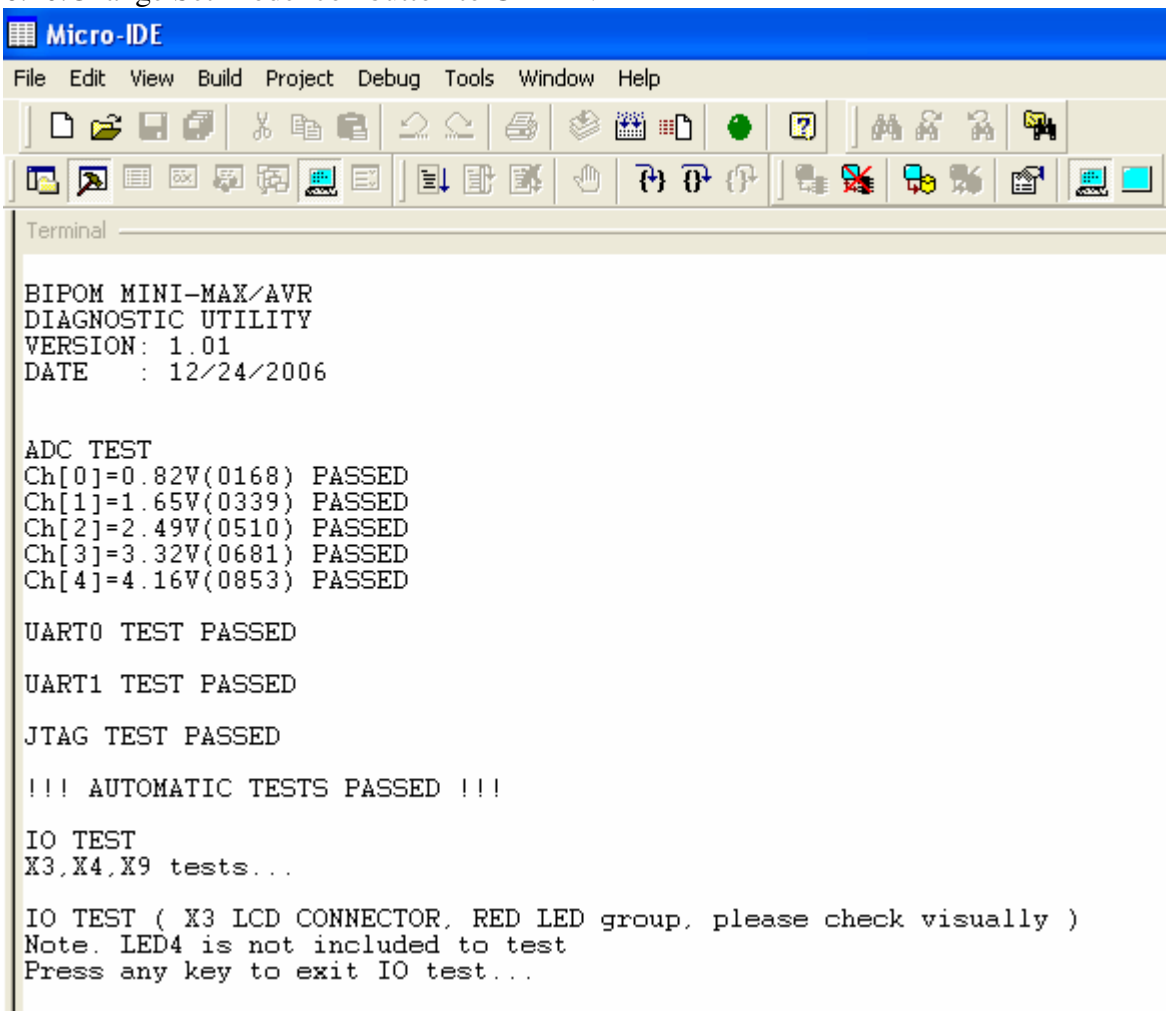


6.1.1. Install 2 jumpers to X1 (JTAG connector).
6.1.2. Install 2 jumpers to X8 (UART1 connector).
6.1.3 Connect a 10-pin header of a serial cable to X5 connector and a jumper between pin 6(CTS0) and pin 4 (RTS0). Only CTS0 and RTS0 lines should be isolated from a serial cable and don't go to a PC COM port.
6.1.4. Connect the other end of the serial cable to your PC's COM port.

6.2. Install MINI-MAX/AVR board to MicroTrak setup (MicroTrak & 8051 IO module).
6.3 Connect a 10-pin flat cable that comes from MicroTrak to X4 (KEYPAD) of MINI-MAX /AVR.
6.4. Connect a 14-pin flat cable that comes from MicroTrak to X3 (LCD) of MINI-MAX /AVR.
6.5. Connect a 20-pin flat cable that comes from MicroTrak to X9 (EXPANSION 3) of MINI-MAX /AVR.
6.6. Go to C:\mmavr_test_plan and double click mmavr_test_plan.prj. Micro-IDE starts.
6.7. Press Connect icon button on Micro-IDE toolbar.

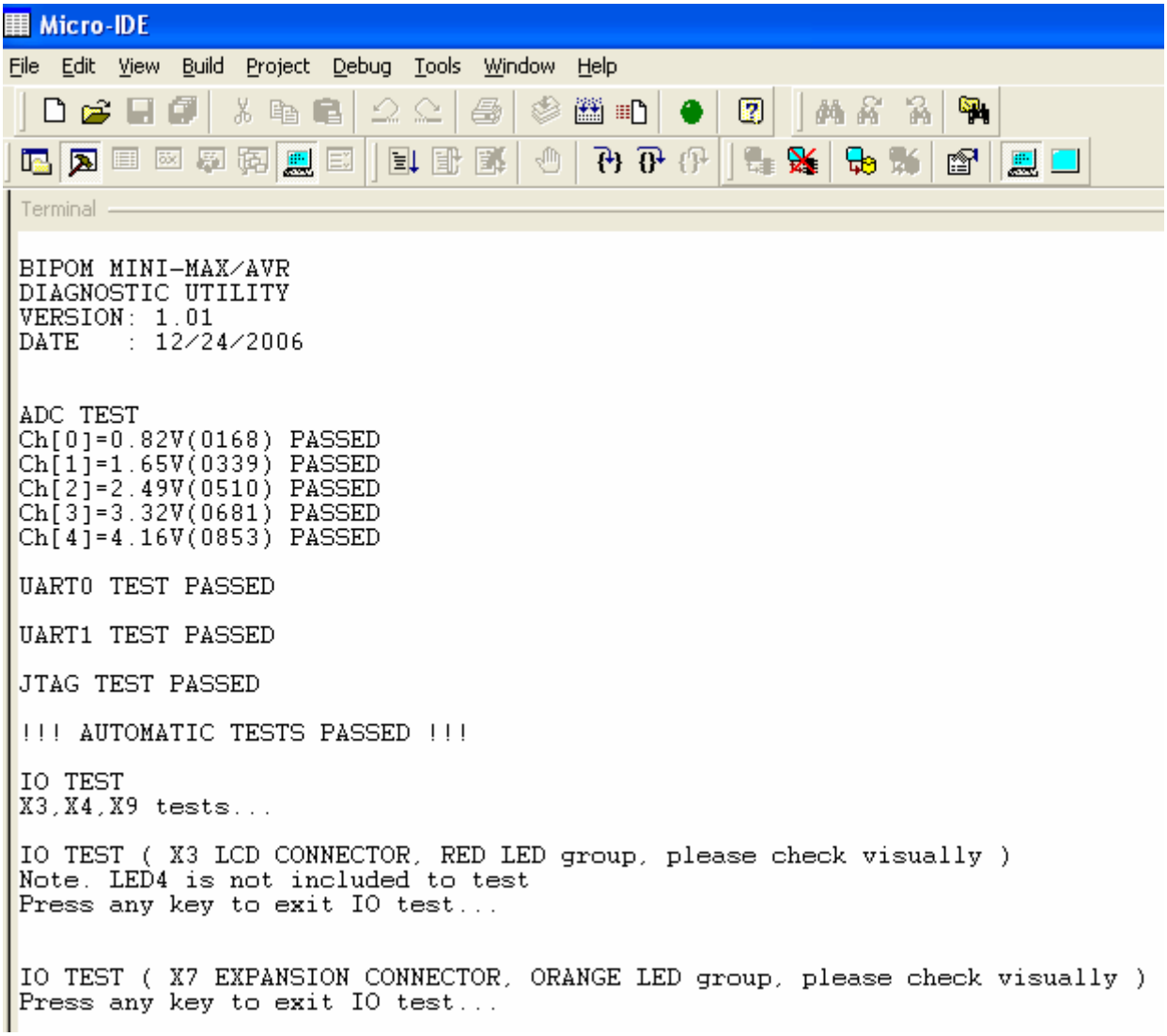
6.8. Change Set Mode icon button to RED.

6.9. Power the setup (MINI-MAX /AVR and MicroTrak).
6.10.Change Set Mode icon button to GREEN



6.11. The test firmware starts. Please note “!!! AUTOMATIC TESTS PASSED !!!” .
It means the board passed all automatic tests (self diagnostic). The next stage of the tests should be inspected visually (LED’s checkings).

At this point 7 RED LED’s should blink periodically.
LED4 (P0.3) should be always ON.
Click the terminal window and press “SPACE” key of a PC’s keyboard. It will switch to ORANGE group of LED’s. At this point 8 ORANGE LED’s should blink periodically.



Press “SPACE” key of a PC’s keyboard. It will switch to YELLOW group of LED’s. At this point 8 YELLOW LED’s should blink periodically.
Press “SPACE” key of a PC’s keyboard. It will switch to GREEN group of LED’s. At this point 8 GREEN LED’s should blink periodically.
Press “SPACE” key of PC keyboard.

6.12. Press “SPACE” key of a PC’s keyboard. Toggle SET MODE button (GREEN->RED->GREEN) to be sure the reset circuit can work properly.

```
IO TEST ( X7 EXPANSION CONNECTOR, GREEN LED group, please check visually )
Press any key to exit IO test...


Please toggle SET MODE button (GREEN->RED->GREEN)
to be sure the reset circuit can work properly...

BIPOM MINI-MAX/AVR
DIAGNOSTIC UTILITY
VERSION: 1.01
DATE   : 12/24/2006


ADC TEST
Ch[0]=0.82V(0168) PASSED
Ch[1]=1.65V(0339) PASSED
Ch[2]=2.49V(0510) PASSED
Ch[3]=3.32V(0681) PASSED
Ch[4]=4.16V(0853) PASSED

UART0 TEST PASSED

UART1 TEST PASSED

JTAG TEST PASSED

!!! AUTOMATIC TESTS PASSED !!!

IO TEST
X3,X4,X9 tests...

IO TEST ( X3 LCD CONNECTOR, RED LED group, please check visually )
Note. LED4 is not included to test
Press any key to exit IO test...
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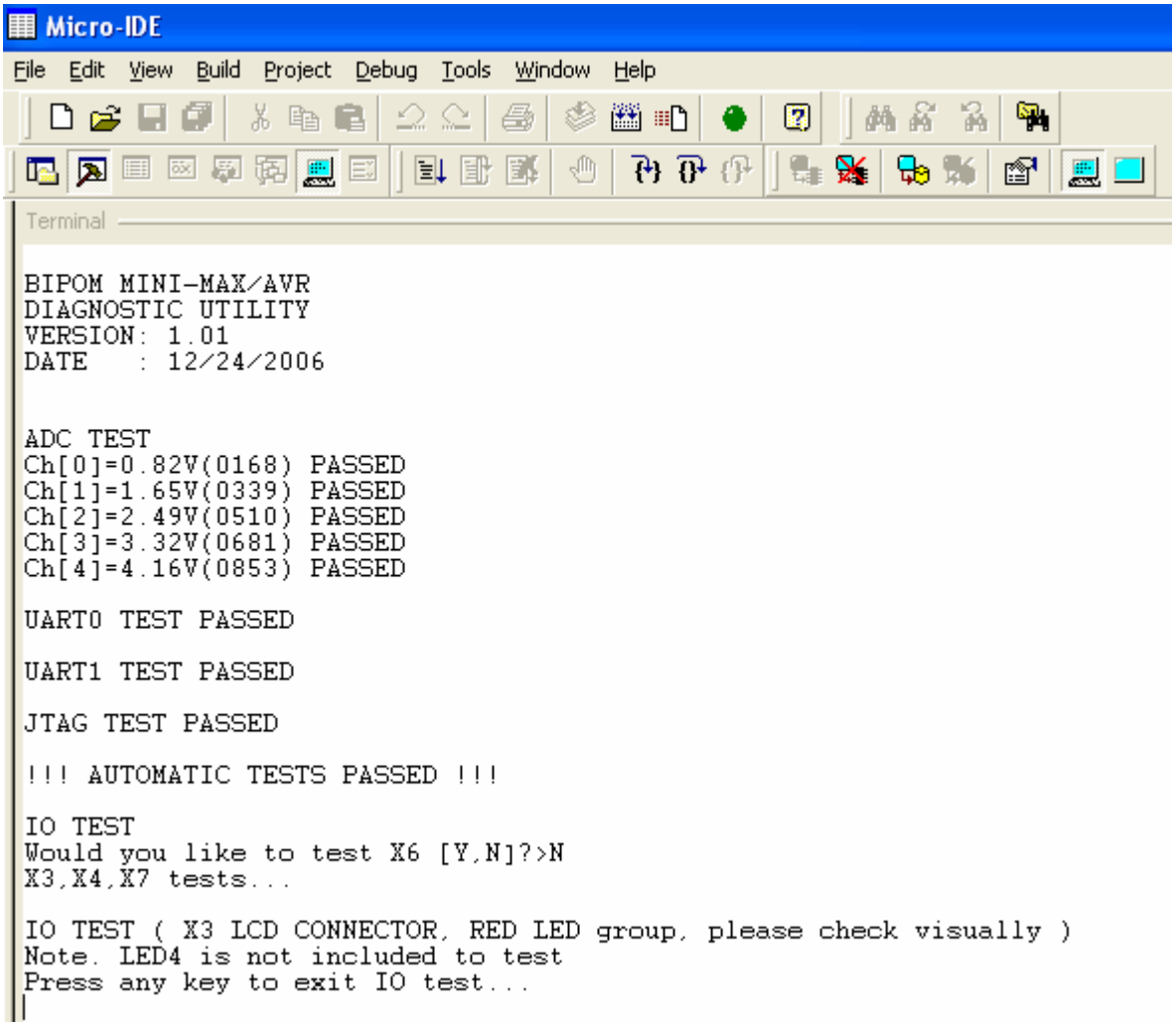
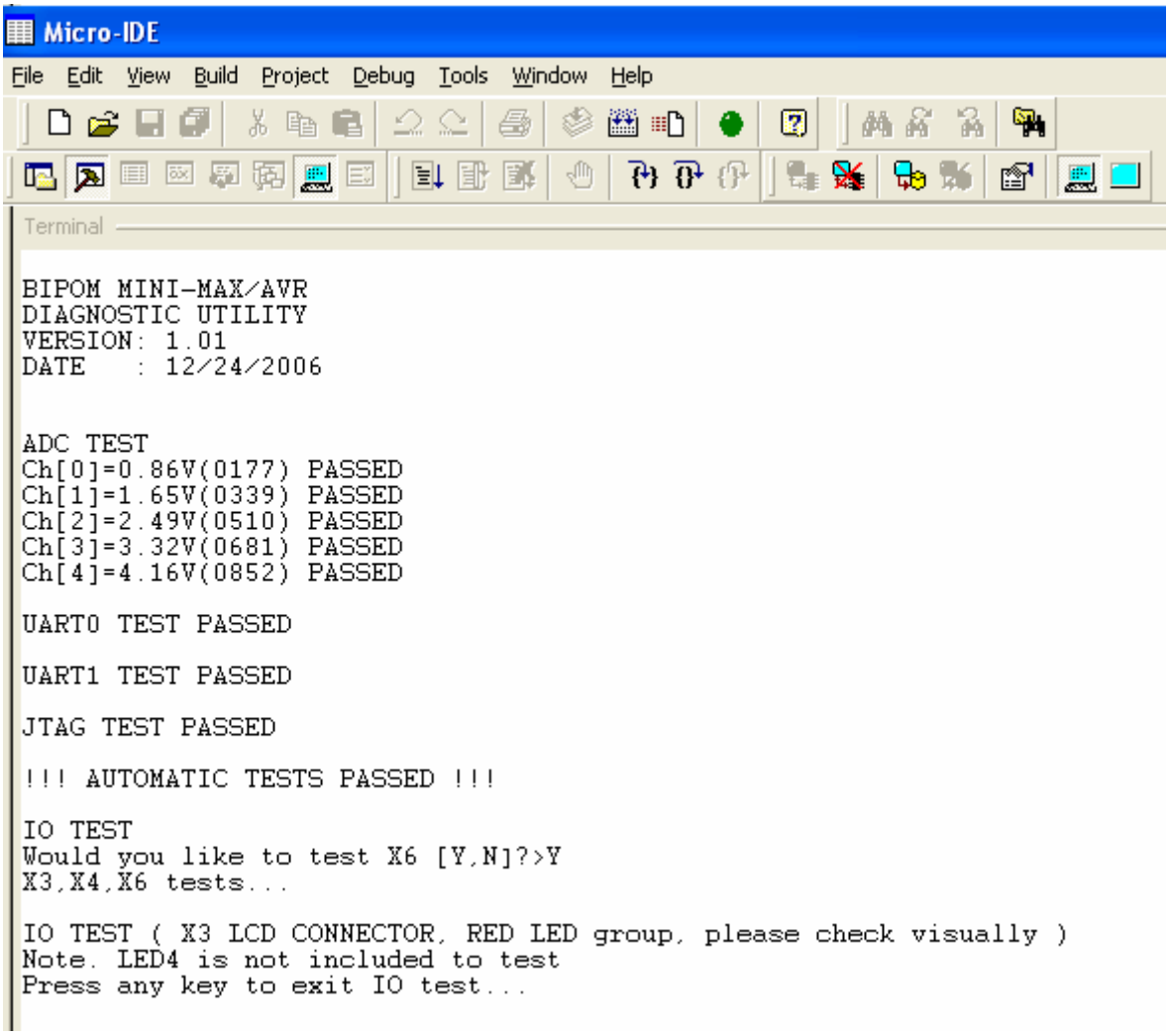
6.13.Change Set Mode to RED. Disconnect the power from the test setup.
6.14.Move a 20-pin flat cable from X9 to X7 connector.
6.15.Power the test setup. Change Set Mode to RED.
6.16.It will ask “Would you like to test X6 [Y,N]?>”. Press “N” key of a PC keyboard.



At this point 7 RED LED's should blink periodically.
LED4 (P0.3) should be always ON.

6.17.Click the terminal window and press "SPACE" key of a PC's keyboard.
It will switch to ORANGE group of LED's. At this point 8 ORANGE LED's should blink periodically.
Press "SPACE" key of a PC's keyboard. It will switch to YELLOW group of LED's. At this point 8 YELLOW LED's should blink periodically.
Press "SPACE" key of a PC's keyboard. It will switch to GREEN group of LED's. At this point 8 GREEN LED's should blink periodically.
Press "SPACE" key of PC keyboard.

6.18.Change Set Mode to RED. Disconnect the power from the test setup.
6.19.Move a 20-pin flat cable from X7 to X6 connector.
6.20.Power the test setup. Change Set Mode to RED.
6.21.It will ask "Would you like to test X6 [Y,N]?>". Press "Y" key of a PC keyboard.



At this point 7 RED LED's should blink periodically.
LED4 (P0.3) should be always ON.

6.22.Click the terminal window and press "SPACE" key of a PC's keyboard.
It will switch to ORANGE group of LED's. At this point 8 ORANGE LED's should blink periodically.
Press "SPACE" key of a PC's keyboard. It will switch to YELLOW group of LED's. At this point 8 YELLOW LED's should blink periodically.
Press "SPACE" key of a PC's keyboard. It will switch to GREEN group of LED's. At this point 8 GREEN LED's should blink periodically.
Press "SPACE" key of PC keyboard.

6.23.Press "SPACE" key of a PC's keyboard. Toggle SET MODE button (GREEN->RED->GREEN) to be sure the reset circuit can work properly.