



# LDM-SYSTEMS

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## QUICK START MANUAL

### Development Board *LDM-MCp0411100101-Q208 Evolution*



***Made in Russia***

**LDM-SYSTEMS**

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**To get started with LDM-MCp0411100101-Q208 development board you must have the following:**

- Operating System: Windows (in this example Windows is considered but users can also run Linux);
- [LDM-MCp0411100101-Q208 Evolution](#);
- Software package for Windows (can be downloaded in «Support» section [«Technical documentation»](#) on the official site [www.multiclet.com](http://www.multiclet.com));
- Driver for FTDI chip, can be downloaded from <http://www.ftdichip.com> (in case Windows 7 driver would be installed automatically);
- Program samples could be downloaded in «Support» section [«Technical documentation»](#) on the official site [www.multiclet.com](http://www.multiclet.com).

1) Install software package. On the default C:\MultiClet would be set (for details see User manual page 17)

2) Connect mini-USB cable to socket 15 on evolution board.



Fig 1. mini-USB cable

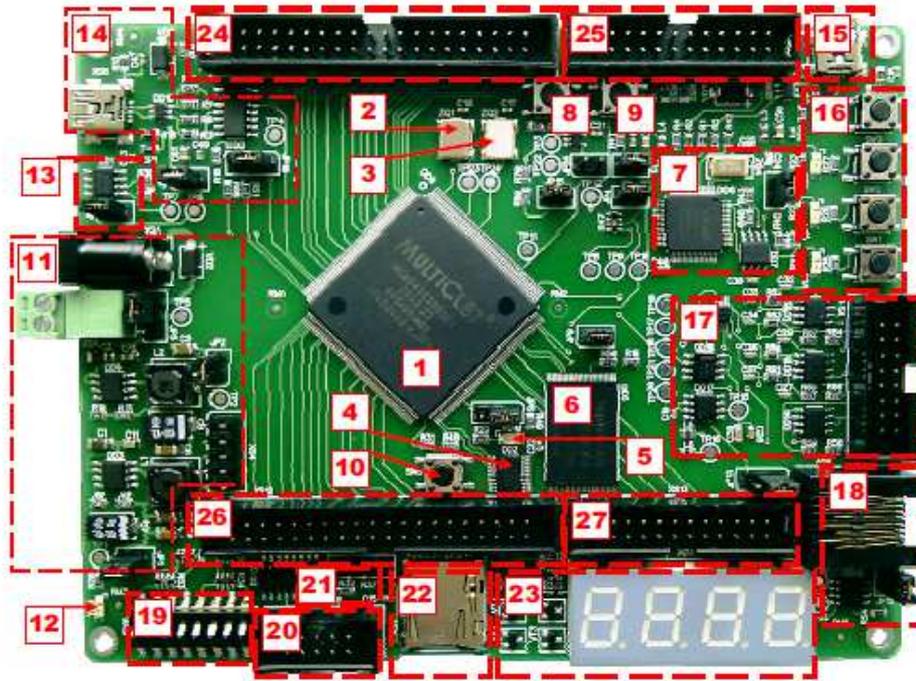


Fig 2. Evolution board LDM with multiclet processor MCP0411100101

- 4) Install FTDI driver. If you use Windows 7 driver would be installed automatically. Otherwise install drivers manually (on this case take jumper JP7 out, see section 7). After that connect mini-USB to the PC.
- 5) Run an example from LDM-MCp04/led/led\_test.ppr.

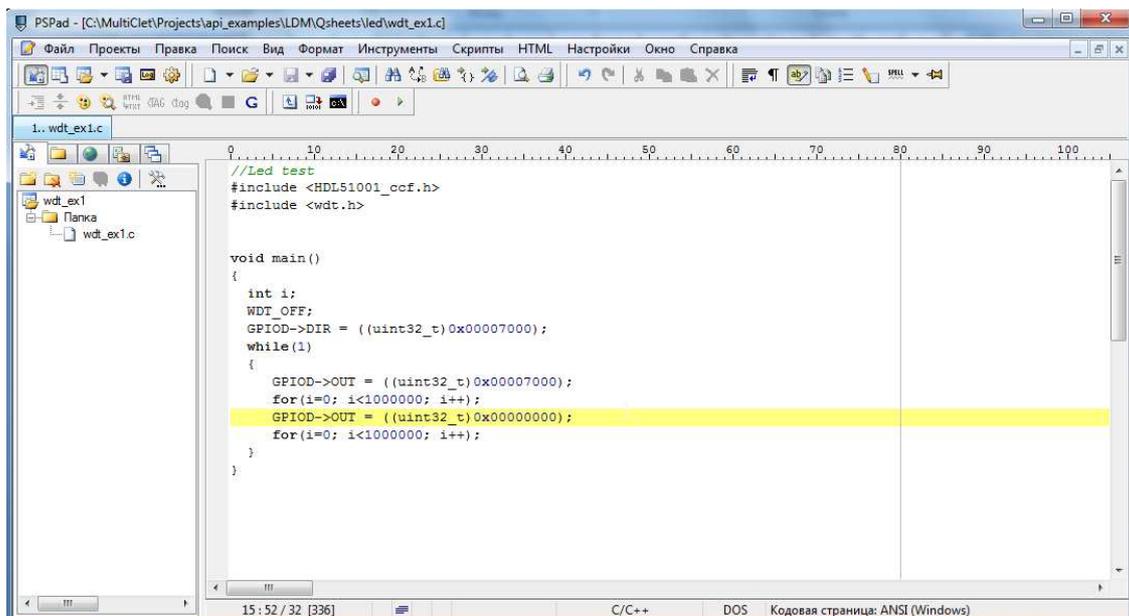


Fig 3. Window PSPad with an example of blinking LEDs

Below you can see program sample:

```
1) #include <HDL51001_ccf.h>
2) #include <wdt.h>
3) void main()
4) {
5)     int i;
6)     WDT OFF;
7)     GPIOD->DIR = ((uint32_t)0x00007000);
8)     while(1)
9)     {
10)        GPIOD->OUT = ((uint32_t)0x00007000);
11)        for(i=0; i<1000000; i++);
12)        GPIOD->OUT = ((uint32_t)0x00000000);
13)        for(i=0; i<1000000; i++);
14)    }
15) }
```

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In this example in lines ##1 and 2 compulsory library is attached (HDL51001\_ccf.h) as well as watchdog timer library (wdt.h);

- in line #3 the main procedure is started;
- in line # 5 int variable is declared (in version MCp0411100101 type short is absent);
- in line #6 macro is used to turn watchdog timer off (if the watchdog timer is not disabled, the processor will be reset every 53);
- in line #7 I/O settings for port D that is correspond to LEDs 1, 2 and 3 (in User Manual you can find a processor I/O list). In Fig. 4 you can find that LEDs on port D are connected to pins 12,13,14,15 so it si corresponded to hexadecimal. Combination uint32\_t - typedef unsigned int uint32\_t from library HDL51001\_ccf.h;
- in line #8 begins endless loop - while();
- in line #10 all three LEDs is turn ON;
- in line #11 - delay loop;
- in line #12 all three LEDs is turn OFF;
- in line #13 - delay loop (like line #11).

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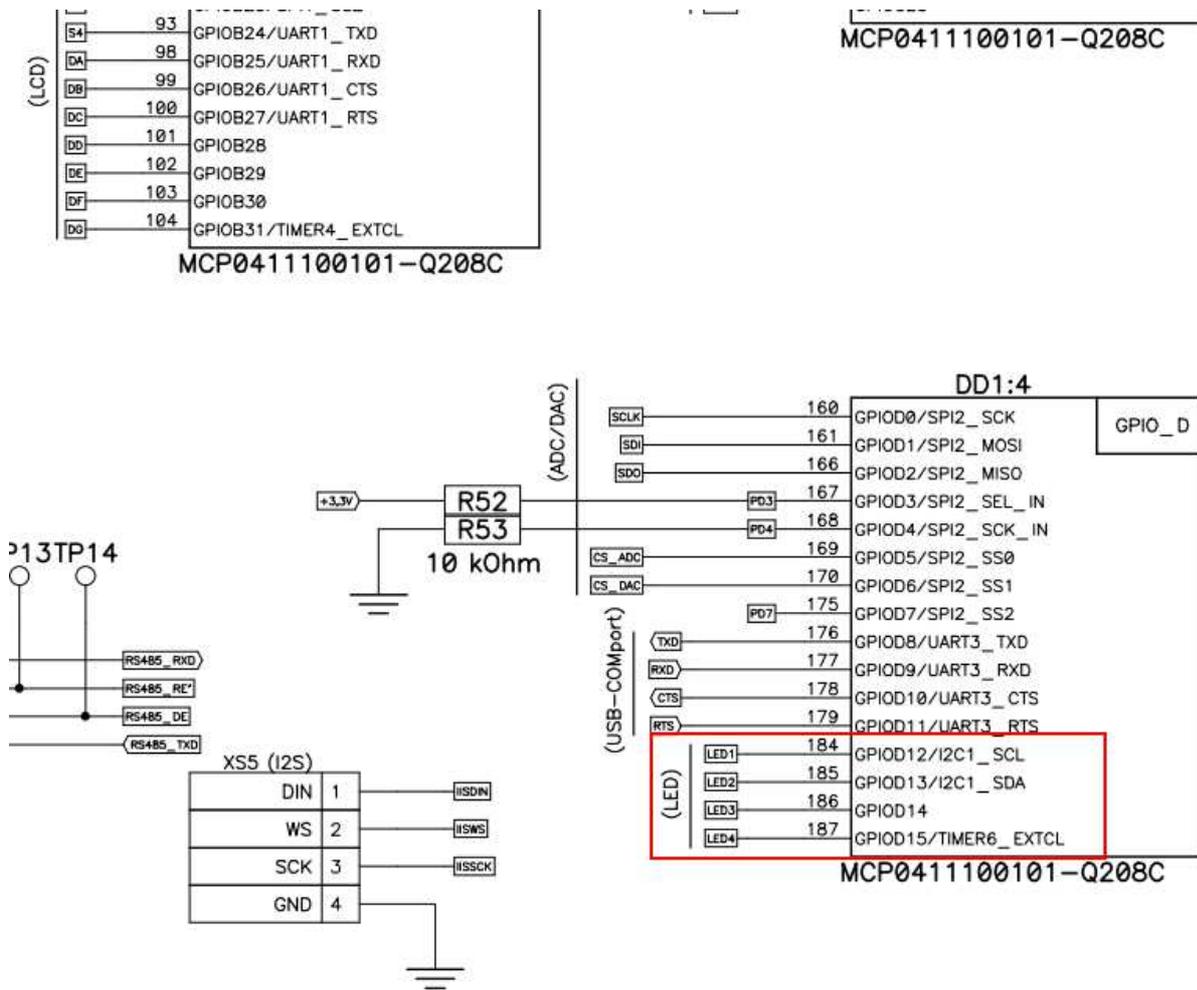


Fig 4. Abstract from technical documentation for LDM-MCp0411100101-Q208 Evolution (see p. 36 DS-QuickStart-MCp0411100101-Q208 Evolution.eng.pdf)

6) Do compilation of the project, press Ctrl + F9 or click correspond button on the toolbar (see Fig. 5).



Fig 5. Compilation in PSPad

After compiling the results window will appear, if you got the message "Process completed, Exit Code 0", the compilation is successful. In the absence of this message, you need to fix an error in the code, compiler will inform you about that. The result of the compilation is shown in Figure 6.

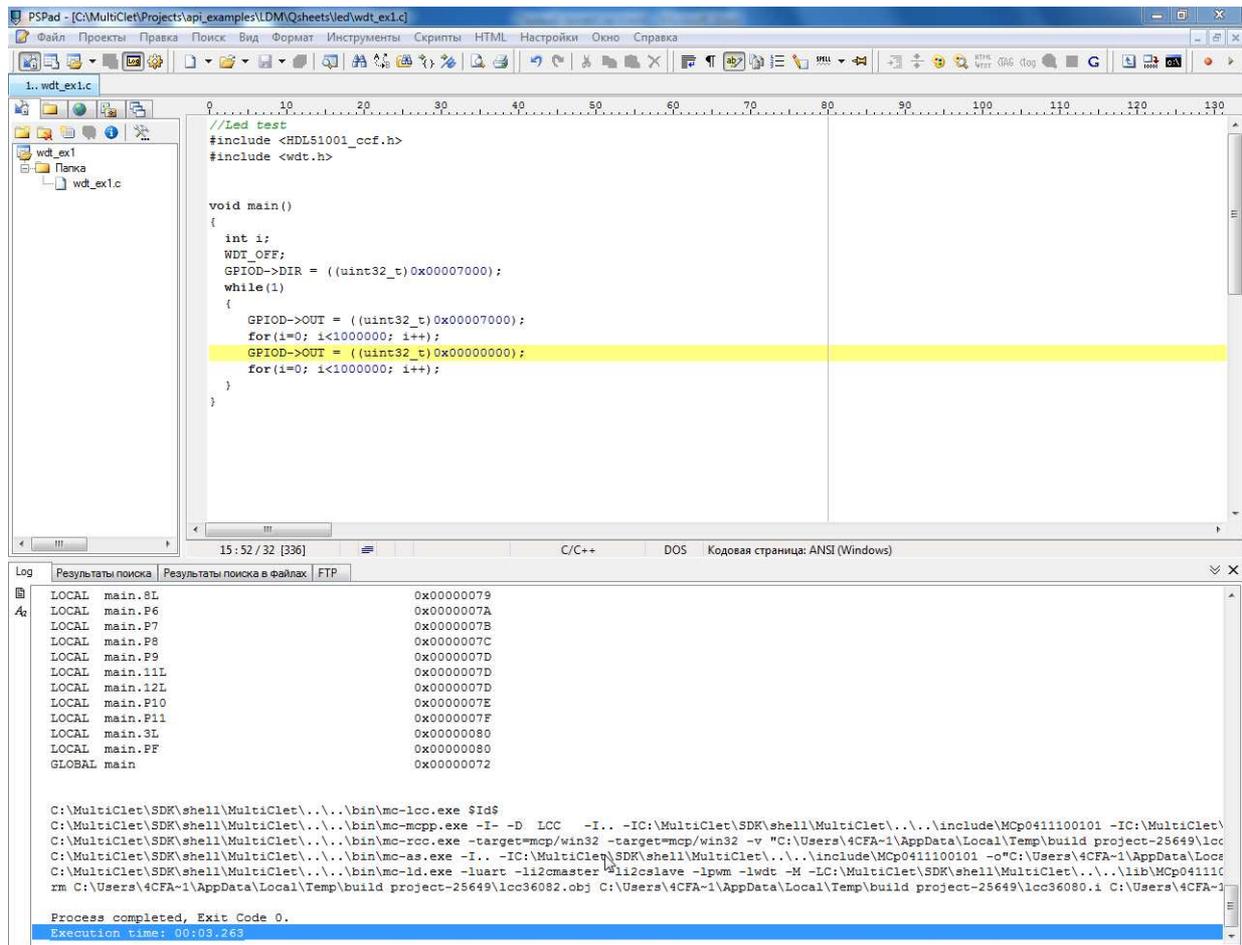


Fig. 6. PSPad window with project compilation

7) Before downloading the project to the development board LDM-MCp0411100101-Q208 Evolution you should check jumpers according to the documentation. Now make a corrections:

- jumper JP5 should be in the position - “powering from USB”, see Fig. 7;
- jumper JP7 should be at the position as on Fig. 8.



Fig 7. Jumper JP5 position



Fig 8. Jumper JP7 is absent

8) For downloading project to the board press **ALT + F9** or click corresponding button on the toolbar (see Fig. 9).

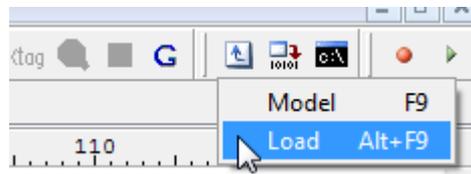


Fig. 9. Downloading the project to the board

9) After downloading is completed three LEDs start to blinking, if not press button SW5 on the board to reset the processor.

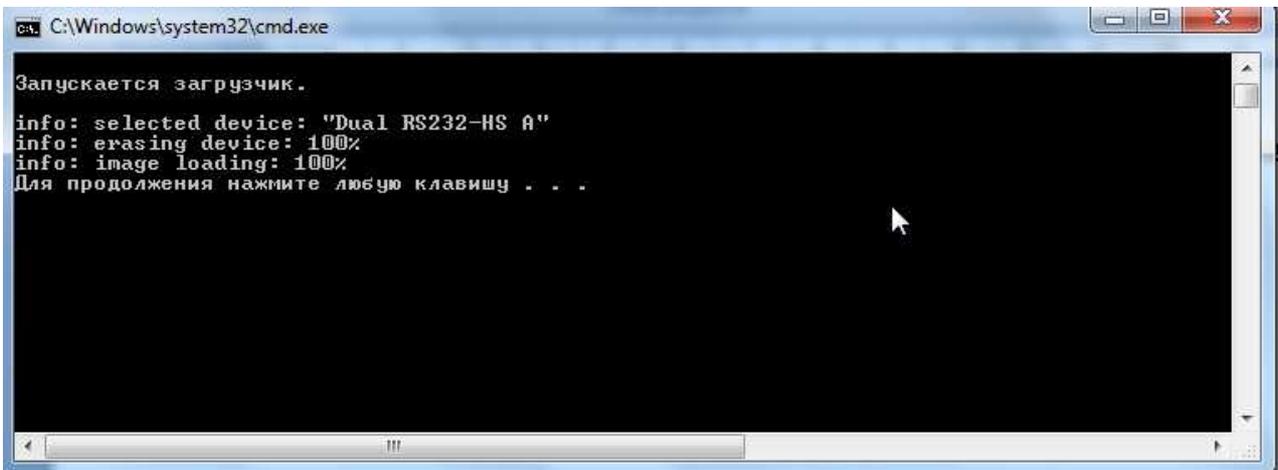


Fig. 10. Downloading final log

If LEDs are blonking – OK. If you have questions please contact Support at [www.multilet.com](http://www.multilet.com).

## Additional

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```
1) In folder Examples/LDM-MCp04 you may find an UART example:
2) #include <HDL51001_ccf.h>
3) #include <uart.h>
4)
5) void main()
6) {
7)     UART_InitTypeDef UART_InitStructure;
8)     GPIOD->BPS = 0x00000F00;//alternative port function for uart3
9)
10)    UART_InitStructure.BaudRate = 38400; //set baudrate
11)    UART_InitStructure.TypeParity = 0x00000000; //parity control type
12)    UART_InitStructure.Parity = 0x00000000; //enable parity control
13)    UART_InitStructure.FlowControl = 0x00000000; //enable cts/rts
14)    UART_InitStructure.Mode = 0x00000003; //rx enable - 1 bit, tx enable - 2 bit
    (rx + tx en)
15)    uart_init(UART3, &UART_InitStructure);
16)    // DM2UART(UART3, 0x00000000, 0x00000800);
17)
18)    uart_send_str(" Hello, I'm MultiClet processor from Russia, Ekaterinburg!",
    UART3);
19)    GPIOD->DIR = ((uint32_t)0x00007000);
20)    GPIOD->OUT = ((uint32_t)0x00007000);
21)
22)    while(UART_FIFO_TX_EMPTY(UART3) == 0);
23)    //UART_SEND_BYTE(0xAB, UART3);
24) }
```

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In this example, compulsory library HDL51001\_ccf.h is attached and the UART interface library - uart.h number in lines #1 and #2. Watchdog timer library is not connected, so the CPU will be reset every 52 s, and the program will be executed from the start.

- in line #6 UART\_InitStructure is set, that has UART\_InitTypeDef type;
- in line #7 I/O that correspond to UART3 (in this board UART3 is connected to FTDI chip, that is used for USB-COM see Fig.4) is configured as alternative function;

- in line #9, set the baud rate of UART (38400 baud) via structure element BaudRate;
- in line #10 set the parity, it is necessary to check data (0 - even);
- in line #11 enable check for parity (0 - disable);
- in line #12 enable hardware data control (0 - disable);
- in line #13 set UART receive/transmit mode (0 - disable, 1 – only receive, 2 - only transmit, 3 – receive and transmit);
- in line #15 initialization of UART3 via UART\_InitStructure (default element values are 0);
- in line #16 executing DM2UART(), that return memory array via UART3 (from 0 to 0x800 bit (2048 bytes));
- in line ##18, 19 returning a line via UART;
- in line ##21, 22 LEDs blinking;
- in line #24 void transmit-data buffer check;
- in line #25 sending byte 0xAB via UART3.

Note: For more information about the UART interface registers use [User Manual](#) for MCp0411100101 processor (download in the "Support", "Technical Documentation and Software" on the official website [www.multiclet.com](http://www.multiclet.com)). The lines number 16, 20 are disabled, to display data memory and bytes 0xAB - uncommented line data \*/

1. For receiving data via UART:

- Plug the evaluation board to the PC (by mini-USB cable);
- Compile the project and download it to the board;
- Use COM-port analysis program.

2. There will be welcoming from the board, see Fig 11.

#	Time	Received	ASCII
000001	17:35:10.065	20 48 65 6C 6C 6F 2C 20 49 27 6D 20 4D 75 6C 74 69 43 6C 65 74 20 70 72 6F 63 65 73 73 6F 72 20	Hello, I'm MultiClet processor
000002	17:35:10.065	66 72 6F 6D 20 52 75 73 73 69 61 2C 20 45 68 61 74 65 72 69 6E 62 75 72 67 21 20 CF F0 E8 E2 E5	from Russia, Ekaterinburg! Привет
000003	17:35:10.081	F2 21 20 DF 20 CF E5 F0 E2 FB E9 20 CC F3 EB FC F2 E8 EA EB E5 F2 EE F7 ED FB E9 20 EF F0 EE F6	т! Я Первый Мультиклеточный процессор из Екатеринбурга!
000004	17:35:10.081	E5 F1 F1 EE F0 20 E8 E7 20 C5 EA E0 F2 E5 F0 E8 ED E1 F3 F0 E3 E0 21	



Fig. 11. Welcoming line from the evolution board

COM-port settings:

- baud rate - 38400;
- word size - 8 bit;
- stop bits – 1;
- parity - none.

For convenience, display data memory by 32 bits per line grouped by 8 bytes.