

mikromedia^m for PIC24[®]

Compact development system rich with on-board peripherals for all-round multimedia development on PIC24F|256GB110 device.









TO OUR VALUED CUSTOMERS

I want to express my thanks to you for being interested in our products and for having confidence in MikroElektronika.

The primary aim of our company is to design and produce high quality electronic products and to constantly improve the performance thereof in order to better suit your needs.

Nebojsa Matic General Manager

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Introduction to mikromedia for PIC24®

The mikromedia for PIC24° is a compact development system with lots of on-board peripherals which allow development of devices with multimedia contents. The central part of the system is a 16-bit PIC24FJ256GB110 microcontroller. The mikromedia for PIC24 features integrated modules such as stereo MP3 codec, TFT 320x240 touch screen display. accelerometer, USB connector, audio connector. MMC/SD card slot, 8 Mbit flash memory, 2x26 connection pads and other. It comes preprogrammed with USB bootloader, but can also be programmed with external programmers, such as mikroProg[™] or ICD2/3. Mikromedia is compact and slim, and perfectly fits in the palm of the hand, which makes it convenient platform for mobile devices.









Package Contains



Damage resistant protective box



mikromedia for PIC24° development system



Two 1x26 male headers and one 1x5 header



mikromedia for PIC24*
user's guide



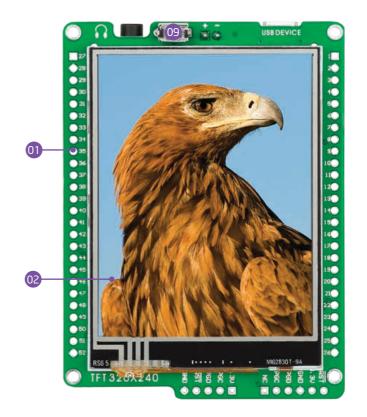
mikromedia for PIC24* schematics and pinout



06 USB cable

Key Features

- 01 Connection Pads
- 02 TFT 320x240 display
- 03 USB MINI-B connector
- 04 CHARGE indication LED
- 05 LI-Polymer battery connector
- 06 3.5mm headphone connector
- 07 Power supply regulator
- Serial Flash memory
- 09 RESET button
- 10 VS1053 Stereo mp3 coder/decoder
- 11 PIC24FJ256GB110 microcontroller
- Accelerometer
- Crystal oscillator
- 14 Power indication LED
- 15 microSD Card Slot
- 16 ICD2/3 connector
- mikroProg connector





System Specification



power supply Via USB cable (5V DC)



power consumption

56 mA with erased MCU (when back-light is ON)



board dimensions

81.2 x 60.5 mm (3.19 x 2.38 inch)



weight

~50g (0.11lbs)



class B product

Product complies with the Class B limit of EN 55022 and can be used in the domestic, residential, commercial and industrial environments.



CAUTION: Electrostatic Sensitive Device

Permanent damage may occur on devices subjected to high energy electrostatic discharges which readily accumulate on the human body or test equipment and can discharge without detection.

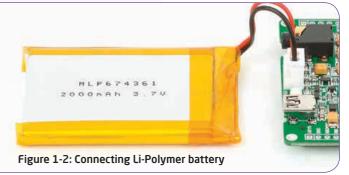
1. Power supply Figure 1-1: Connecting

USB power supply

You can apply power supply to the board using MINI-B USB cable provided with the board. On-board voltage regulators provide the appropriate voltage levels to each component of the board. Power LED (GREEN) will indicate the presence of power supply.

Battery power supply

You can also power the board using Li-Polymer battery, via on-board battery connector. On-board battery charger circuit MCP73832 enables you to charge the battery over USB connection. LED diode (RED) will indicate battery charging. Led is off when battery is full. Charging current is ~250mA and charging voltage is 4.2V DC.



USB power supply

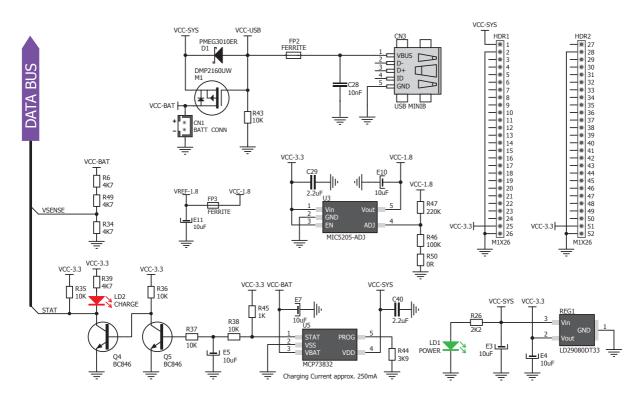


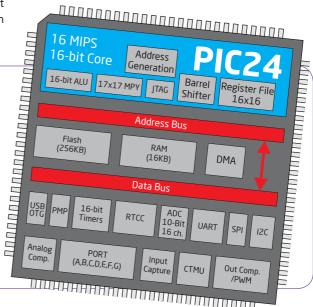
Figure 1-3: Power supply schematics

2. PIC24FJ256GB110 microcontroller

The mikromedia for PIC24° development system comes with the PIC24FJ256GB110 microcontroller. This high-performance 16-bit microcontroller with its integrated modules and in combination with other on-board modules is ideal for multimedia applications.

Key microcontroller features

- Up to 16 MIPS Operation;
- 16-bit architecture:
- 256KB of program memory;
- 16.384 Bytes of RAM;
- 84 I/O pins;
- Internal Oscillator 8 MHz, 32kHz;
- nanoWatt features: Fast Wake/Fast Control;
- 4-UART, 3-SPI, 3-I2C, USB 2.0 OTG;
- DAC, ADC, etc.



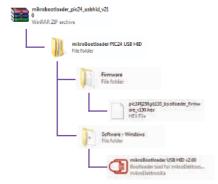
3. Programming the microcontroller Figure 3-1: PIC24FJ256GB110 microcontroller The microcontroller can be programmed in three ways: Over USB HID mikroBootloader Using mikroProg[™] external programmer Using ICD2/3 external programmer

Programming with mikroBootloader

You can program the microcontroller with bootloader which is preprogrammed into the device by default. To transfer .hex file from a PC to MCU you need bootloader software (mikroBootloader USB HID) which can be downloaded from:



Upon download, unzip it to desired location and start the mikroBootloader application:



step 1 - Connecting mikromedia



Figure 3-2: USB HID mikroBootloader window

01 In order to start, connect the USB cable or (if already connected) press the **Reset** button on your mikromedia board. Click the **Connect** button within 5s to enter the bootloader mode, otherwise the existing microcontroller program will be executed.

step 2 - Browsing for .HEX file



Figure 3-3: Browse for HEX

Olick the Browse for HEX button and from a pop-up window (Figure 3.4) choose the .HEX file which will be uploaded to MCU memory.

step 3 - Selecting .HEX file



Figure 3-4: Selecting HEX

- 01 Select .HEX file using open dialog window.
- OZ Click the Open button.

step 4 - Uploading .HEX file



Figure 3-5: Begin uploading

To start .HEX file boot loading click the Begin uploading button.



Figure 3-6: Progress bar

01 .HEX file uploading can be monitored via progress bar.

step 5 - Finish upload



Figure 3-7: Restarting MCU

OI Click the OK button after uploading is finished and wait for 5 seconds. Board will automatically reset and your new program will execute.



Figure 3-8: mikroBootloader ready for next job

Programming with mikroProg[™]

programmer

The microcontroller can be programmed with mikroProg[™] programmer and mikroProg Suite[™] for PIC* software. The mikroProg[™] programmer is connected to the development system via the CN6 connector, Figure 3-9.



Figure 3-9: Connecting mikroProg[™] to mikromedia[™]

mikroProgTM is a fast USB 2.0 programmer with mikroICDTM hardware In-Circuit Debugger. Smart engineering allows mikroProgTM to support PIC10*, PIC12*, PIC16*, PIC18*, dsPIC30/33*, PIC24* and PIC32* devices in a single programmer. It supports over 570 microcontrollers from Microchip*. Outstanding performance, easy operation and elegant design are it's key features.

mikroProg Suite[™] for PIC[®] Software







mikroProg[™] programmer requires special programming software called mikroProg Suite™ for PIC®. This software is used for programming of ALL Microchip® microcontroller families, including PIC10°, PIC12°, PIC16°, PIC18°, dsPIC30/33°, PIC24° and PIC32°. Software has intuitive interface and SingleClick™ programming technology. Just by downloading the latest version of mikroProg Suite™ your programmer is ready to program new devices. mikroProg Suite™ is updated regularly, at least four times a year, so your programmer will be more and more powerful with each new release.



Figure 3-10: Main Window of mikroProg Suite™ for PIC® programming software

Programming with

ICD2® or ICD3® programmer

The microcontroller can be also programmed with ICD2° or ICD3° programmer. These programmers connects with mikromedia board via ICD2 CONNECTOR BOARD.

The second secon

Figure 3-11: Placing ICD2* connector Figure 3-12: Connecting ICD2* or ICD3* programmer

In order to enable the ICD2* and ICD3* programmers to be connected to the development system, it is necessary to provide the appropriate connector such as the ICD2 CONNECTOR BOARD. This connector should be first soldered on the CN5 connector. Then you should plug the ICD2* or ICD3* programmer into it, Figure 3-11.

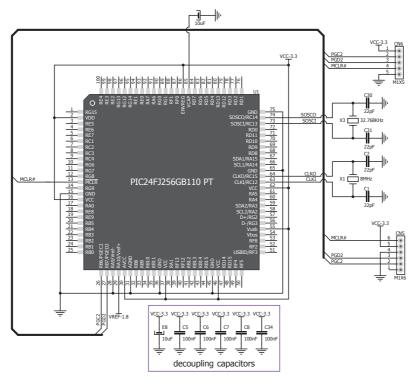
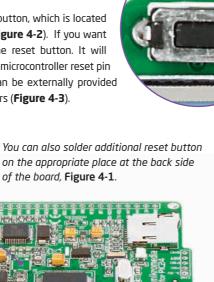


Figure 3-13: mikroProg™ & ICD2 / ICD3 programmer connection schematic

4. Reset Buttons

Board is equipped with reset button, which is located at the top of the front side (**Figure 4-2**). If you want to reset the circuit, press the reset button. It will generate low voltage level on microcontroller reset pin (input). In addition, a reset can be externally provided through **pin 27** on side headers (**Figure 4-3**).

NOTE



32

3838



Figure 4-1: Location of additional reset button

Figure 4-2: Frontal reset button

USB DEVICE

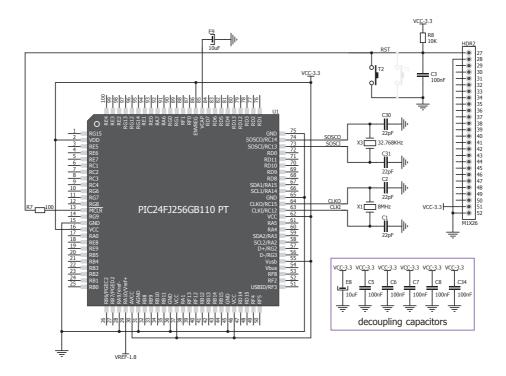


Figure 4-3: Reset circuit schematic

5. Crystal Oscillator



Figure 5-1: Crystal oscillator module (X1)

Board is equipped with 8MHz crystal oscillator
(X1) circuit that provides external clock waveform
to the microcontroller CLKO and CLKI pins. This base
frequency is suitable for further clock multipliers and ideal
for generation of necessary USB clock, which ensures proper
operation of bootloader and your custom USB-based applications. Board
also contains 32.768kHz Crystal oscillator (X3) which provides external
clock for internal RTCC module.

NOTE: The use of crystal in all other schematics is implied even if it is purposely left out, because of the schematics clarity.

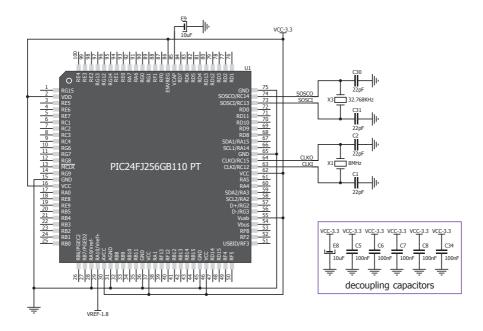
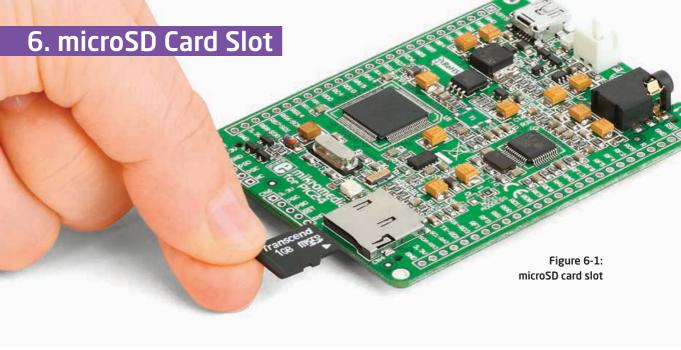


Figure 5-2: Crystal oscillator schematic



Board contains microSD card slot for using microSD cards in your projects. It enables you to store large amounts of data externally, thus saving microcontroller memory. microSD cards use Serial Peripheral Interface (SPI) for communication with the microcontroller.

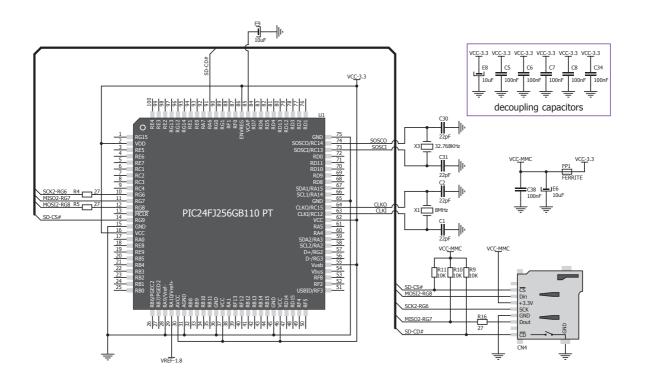


Figure 6-2: microSD Card Slot module connection schematic

7. Touch Screen



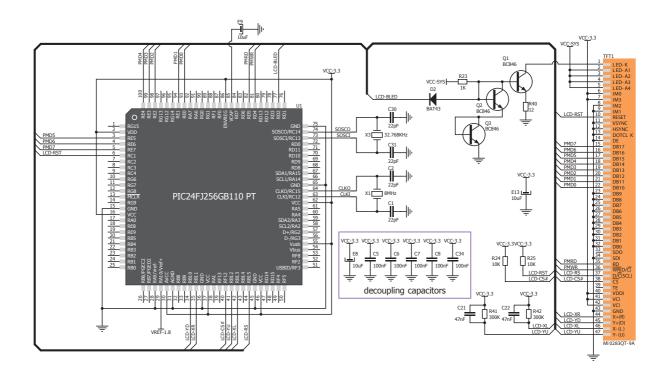
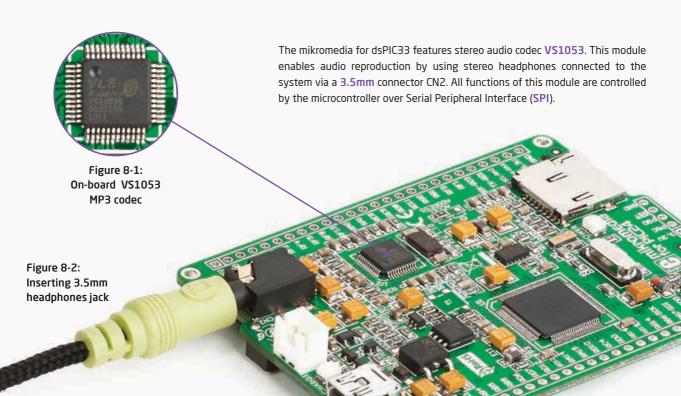


Figure 7-2: Touch Screen connection schematic

8. Audio Module



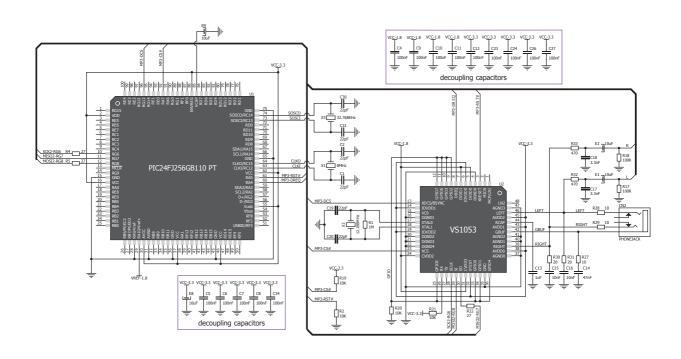
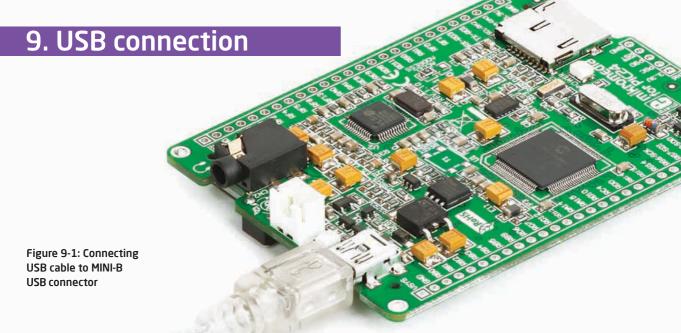


Figure 8-3: Audio module connection schematic



PIC24FJ256GB110 microcontroller has integrated USB module, which enables you to implement USB communication functionality to your mikromedia board. Connection with target USB host is done over MINI-B USB connector which is positioned next to the battery connector.

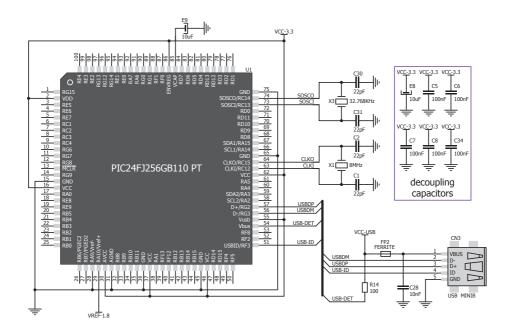


Figure 9-2: USB module connection schematic

10. Accelerometer



Figure 10-1: Accelerometer module

On board **ADXL345** accelerometer is used to measure acceleration in three axis: x, y and z. The accelerometer function is defined by the user in the program loaded into the microcontroller. Communication between the accelerometer and the microcontroller is performed via the I²C interface.



You can set the accelerometer address to 0 or 1 by re-soldering the SMD jumper (zero-ohm resistor) to the appropriate position. Jumper is placed in address 1 position by default.

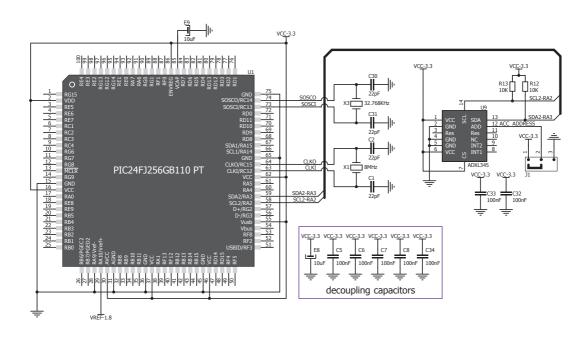
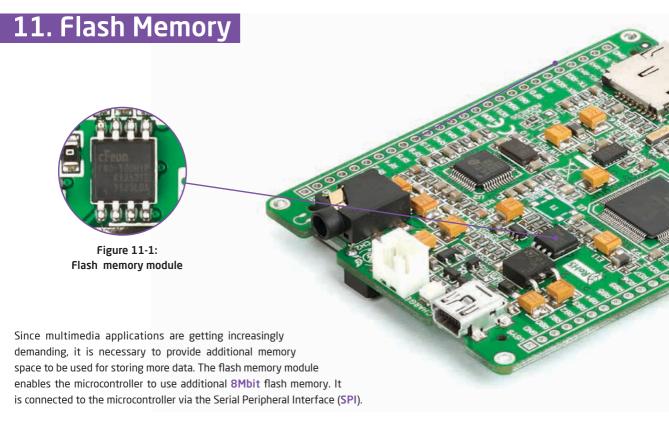


Figure 10-2: Accelerometer connection schematic



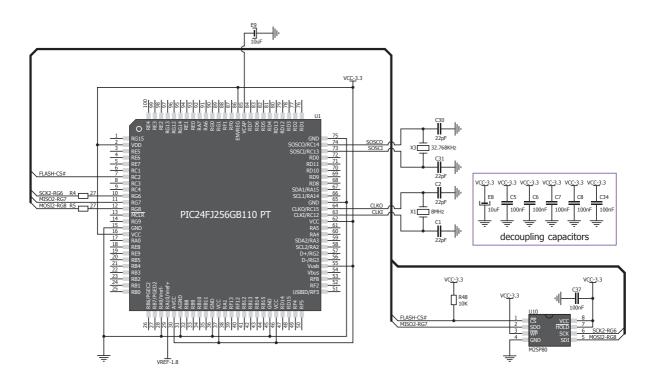


Figure 11-2: Flash memory module connection schematic

12. Pads PIC24F1256GB110 PT decoupling capacitors Pads HDR1 Pads HDR2

Figure 12-1: Connection pads schematic

Most microcontroller pins are available for further connectivity via two 1x26 rows of connection pads on both sides of the mikromedia board. They are designed to match additional shields, such as Battery Boost shield, Gaming, PROTO shield and others.



13. Pinout 5V power supply 5V -RST Reset pin Reference Ground GND -GND Reference Ground R_B0 audio out RB1 right ch. -RB₂ Analog Lines RF₂ **PWM lines** RoHS RB9 Interrupt Lines Digital I/O lines Digital I/O lines - RX UART SPI2 **RG8** -3.3V power supply 3.3V -3.3V - 3.3V power supply Reference Ground GND · Reference Ground GND Pin functions Pin functions Digital lines Analog Lines Interrupt Lines SPI Lines II I2C Lines II UART lines PWM lines

14. Dimensions 81.15 3195 73.66 2900 **4** 157 63.5 276 63 RST • 3.30 GND USB DEVICE 8.89 PGD PGC NC 3.30 PGC **60.45** 2380 **55.88** 2200 PGD **50.2** 1976 43.2 RST GND TFT 320X240 7.62 2.03 2.54 100 لبار 2.67 105 Legend mm 57.6 **3.2** 126 2268 mils 69.3 2728

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15. mikromedia Accessories

We have prepared a set of extension boards pin-compatible with your mikromedia, which enable you to easily expand your board basic functionality. We call them mikromedia shields. But we also offer other accessories, such as Li-polymer battery, stacking headers, wire jumpers and more.



01 Connect shield



02 BatteryBoost shield



PROTO shield



04 Gaming shield



05 mikroBUS shield



06 Li-Polimer battery



Wire Jumpers

What's next?

You have now completed the journey through each and every feature of mikromedia for PIC24® board. You got to know it's modules and organization. Now you are ready to start using your new board. We are suggesting several steps which are probably the best way to begin. We invite you to join the users of mikromedia™ brand. You will find very useful projects and tutorials and can get help from a large ecosystem of users. Welcome!

Compiler

You still don't have an appropriate compiler? Locate dsPIC/PIC24® compiler that suits you best on our site:

http://www.mikroe.com/pic/compilers/

Choose between mikroC[™], mikroBasic[™] and mikroPascal[™] and download fully functional demo version, so you can begin building your first applications.





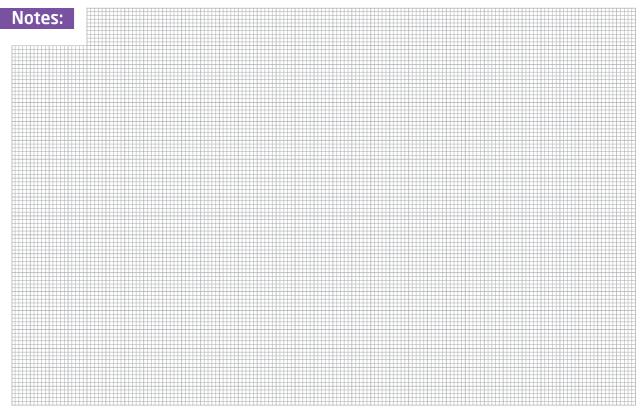
Projects

Once you have chosen your compiler, and since you already got the board, you are ready to start writing your first projects. **Visual TFT software** for rapid development of graphical user interfaces enables you to quickly create your GUI. It will automatically create necessary code which is compatible with mikroElektronika compilers. Visual TFT is rich with examples, which are an excellent starting point for your future projects. Just load the example, read well commented code, and see how it works on hardware. Visual TFT is also available on our site:

http://www.mikroe.com/visualtft/

N	otes	





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многоканальный

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http://moschip.ru/get-element

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