

mikromedia
board for Stellaris M3

Compact development system rich with on-board peripherals for all-round multimedia development on LM3S9B95 device





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Nebojsa Matic General Manager

Table of Contents

Introduction to mikromedia for Stellaris® M3	4	5. Crystal oscillator	18
Package Contains	5	6. microSD Card Slot	19
Key Features	6	7. Touch Screen	20
System Specification	7	8. Audio Module	22
1. USB power supply	8	9. USB connection	24
2. Battery power supply	9	10. Accelerometer	26
3. Stellaris® LM3S9B95 microcontroller	10	11. Flash Memory	27
Key microcontroller features	10	12. Pads	28
4. Programming the microcontroller	11	13. Pinout	29
Programming with mikroBootloader	12	14. Dimensions	30
step 1 - Connecting mikromedia	12		
step 2 - Browsing for .hex file	13		
step 3 - Select .hex file	13		
step 4hex file uploading	14		
step 5 - Finish upload	15		
Programing with mikroProg [™] programmer	16		

Introduction to mikromedia for Stellaris® M3

The mikromedia for Stellaris® M3 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 the 32-bit ARM® Cortex™-M3 LM3S9B95 microcontroller. The mikromedia for Stellaris® M3 features integrated modules such as stereo MP3 codec. TFT 320x240 touch screen display, accelerometer, USB connector, MMC/SD card slot and other. It comes pre-programmed with USB bootloader, but can also be programmed with external mikroProg[™] for Stellaris® or JTAG programmer. 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 Stellaris® M3 development system



O3 DVD with documentation and examples



mikromedia for Stellaris® M3 user's guide



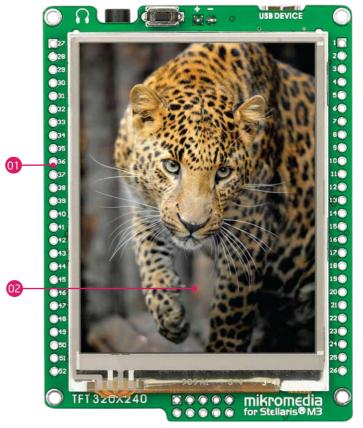
mikromedia for Stellaris® M3® schematic



USB cable

Key Features

- 01 Connection Pads
- 02 TFT 320x240 display
- 03 USB MINI-B connector
- 04 Li-Polymer battery connector
- 05 3.5mm headphone connector
- Power supply regulator
- 07 Serial Flash memory
- 08 VS1053 Stereo mp3 coder/decoder
- 09 RESET button
- 10 Stellaris® ARM® Cortex™-M3 LM3S9B95 device
- Accelerometer
- 12 8MHz crystal oscillator
- microSD Card Slot
- 14 Power indicator LED
- 15 JTAG programmer connector





System Specification



power supply

Over a USB cable (5V DC)



power consumption

79 mA with erased MCU

(when on-board modules are inactive)



board dimensions

8 x 6cm (3.14 x 2.36 inch)



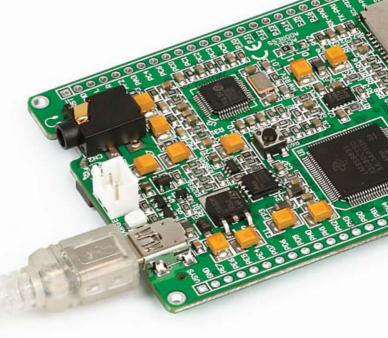
weight

~46 g (0.10 lbs)

1. USB power supply



Figure 1-1: Powering your mikromedia board with USB cable



You can apply power supply to the board using **MINI-B USB** cable provided with the board. On-board voltage regulators will make sure to regulate the appropriate voltage levels to each part of the board. **Power LED** will indicate the presence of power supply.

2. Battery power supply

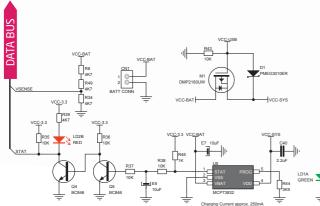
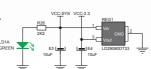




Figure 2-1: Connecting Li-polymer battery to mikromedia board

Figure 2-2: Battery charger and power management connection schematics



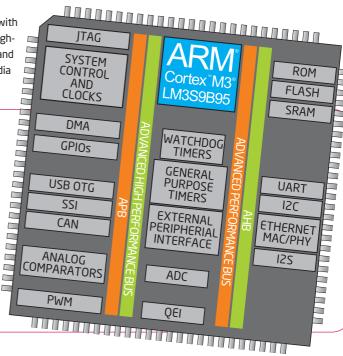
You can also power the board using **Li-Polymer** battery, via on-board battery connector. On-board battery charger circuit **MCP73832** enables you to charge the battery over USB connection. Charging current is ~250mA and charging voltage is 4.2V DC.

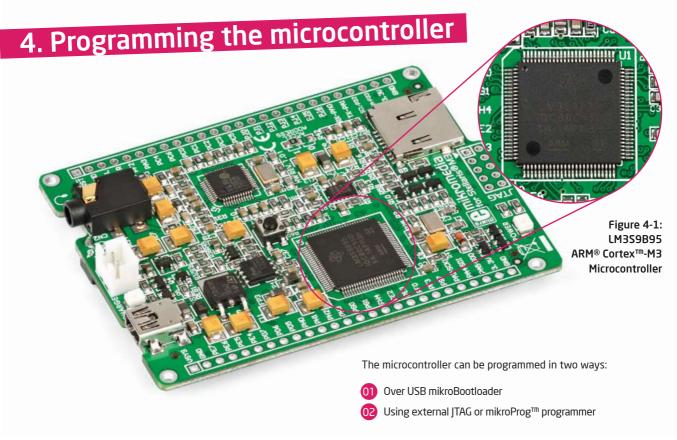
3. Stellaris® LM3S9B95 microcontroller

The mikromedia for Stelaris® M3 development board comes with the ARM® Cortex®-M3 LM3S9B95 microcontroller. This high-performance 32-bit microcontroller with its integrated modules and in combination with other on-board modules is ideal for multimedia applications.

Key microcontroller features

- Up to 100 DMIPS Operation;
- 8/16/32-bit architecture:
- 256KB of Flash memory;
- 96KB of SRAM memory;
- 65 I/O pins;
- 32kHz RTCC:
- IEEE 1588
- Ethernet, UART, SPI, ADC, etc.





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:



After software is downloaded unzip it to desired location and start mikroBootloader USB HID software.



step 1 - Connecting mikromedia



Figure 4-2: mikroBootloader USB HID

- Onnect mikromedia board with a PC via USB cable and USB icon will turn red.
- O2 Click the **Connect button** whitin 5s, otherwise existing microcontroller program will execute.

step 2 - Browsing for .hex file



Figure 4-3: Browse for HEX

01 Click on Browse for HEX button

step 3 - Select .hex file

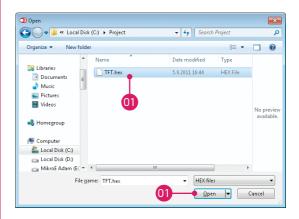


Figure 4-4: Selecting HEX

- 01) Select .hex file via open window
- O2 Click on Open button

step 4 - .hex file uploading



Figure 4-5: Begin uploading

To start .hex file uploading click on Begin uploading button



Figure 4-6: Progress bar

01) You can monitor .hex file uploading via progress bar

step 5 - Finish upload



Figure 4-7: Restarting MCU

01 To finish uploading click on **OK button**



Figure 4-8: mikroBootloader ready for next job



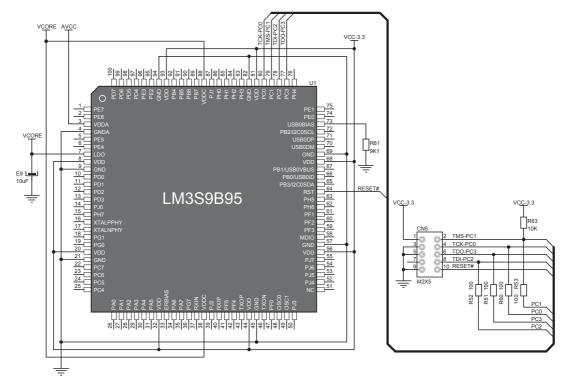
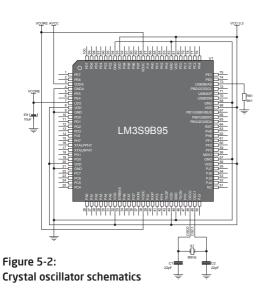
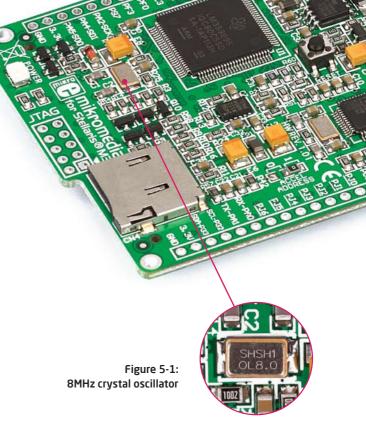


Figure 4-10: mikroProg™ programmer connection schematics

5. Crystal oscillator

Board is equipped with **8Mhz crystal oscillator** circuit that provides stable clock signal to the microcontroller OSC pins. Internally, this signal is used for creating the clock necessary for the operation of microcontroller.





Page 18

6. microSD Card Slot

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.

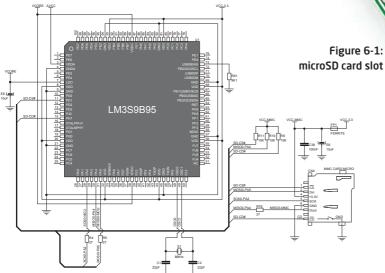
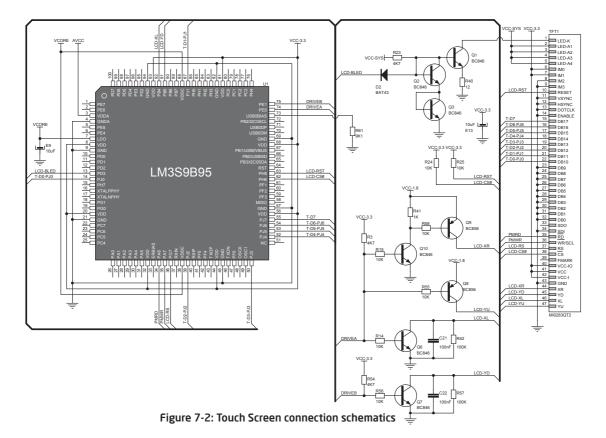
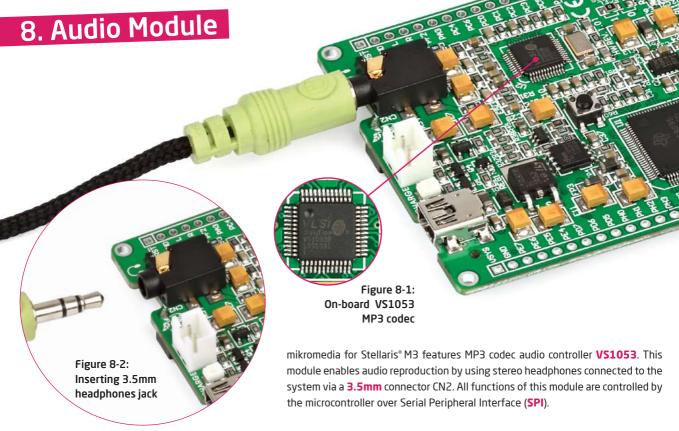


Figure 6-2: microSD Card Slot module connection schematics

7. Touch Screen The development system features a TFT 320x240 display covered with a resistive touch panel. Together they form a functional unit called a touch screen. It enables data to be entered and displayed at the same time. The TFT display is capable of showing data in **262.000** different **colors**. Figure 7-1: Touch Screen



Page 21



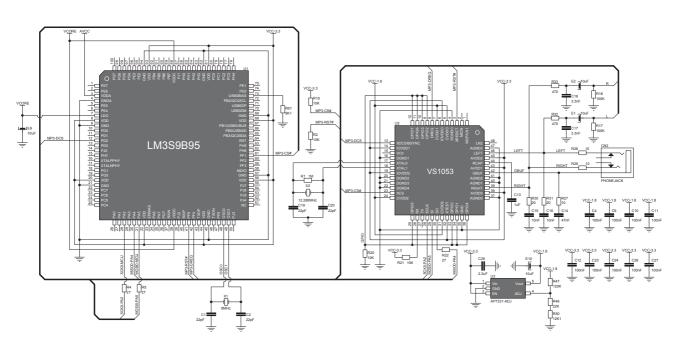
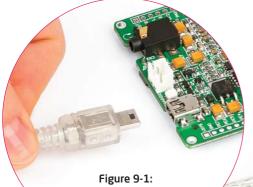


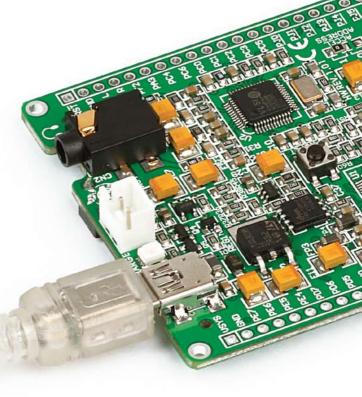
Figure 8-3: Audio module connection schematics

9. USB connection

LM3S9B95 microcontroller has integrated USB module, which enables you to implement USB communication functionality of your mikromedia board. Connection with target USB host is done over **MINI-B USB** connector which is positioned next to the battery connector.



Connecting USB cable to programming connector



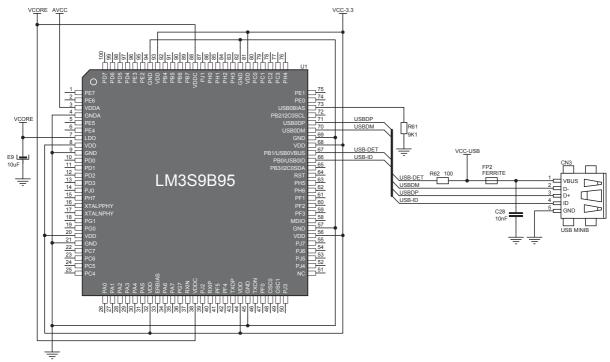
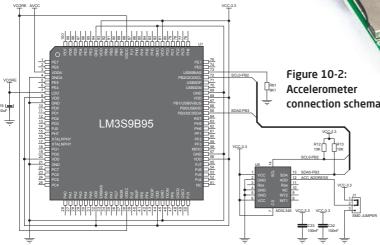


Figure 9-2: USB module connection schematics

10. Accelerometer

On board ADXL345 accelerometer, among other features, can be used to measure acceleration in three axis: x, y, and z. The accelerometer's 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.

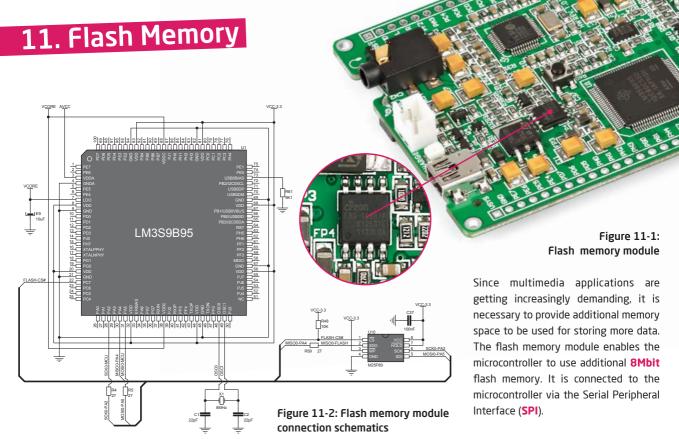


connection schematics

Figure 10-1: Accelerometer module

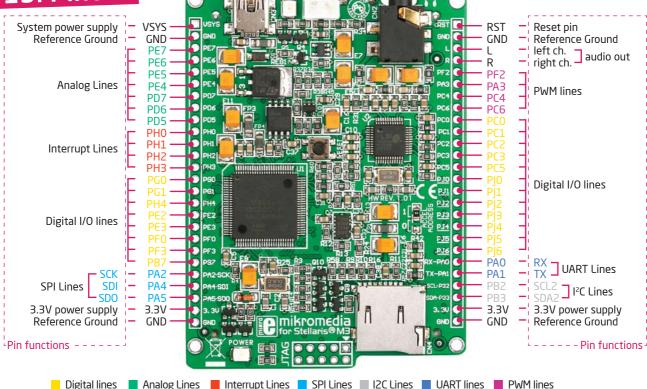


You can set the accelerometer address to 0 or 1 by re-soldering the SMD jumper (zero-ohm resistor) to the appropriate position. Jumper is placed in address 1 position by default.

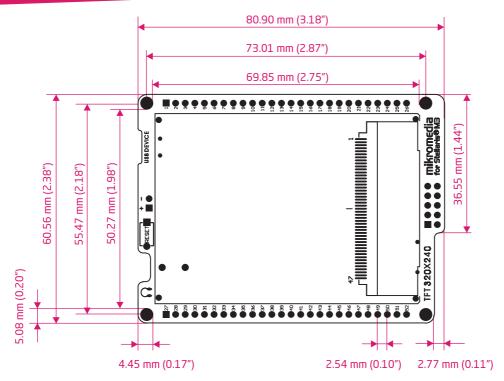


12. Pads LM3S9B95 Figure 12-1: Pads connecting Pads HDR1 Pads HDR2 schematics Most microcontroller pins are available for further connectivity via two 1x26 rows of connection pads on both sides of the mikromedia board. They are designed to match additional shields, such as Battery Boost shield, Gaming, PROTO shield and others. Pads with underlined silkscreen markings have multiple functions (see the complete schematic for more information).

13. Pinout



14. Dimensions



Page 30

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