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mikromedia for dsPIC33®

Compact development system rich with on-board peripherals for all-round multimedia development on dsPIC33FJ256GP710A 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 dsPIC33[®]

mikromedia for dsPIC33[®] 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 dsPIC33FJ256GP710A microcontroller, mikromedia for dsPIC33 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 pre-programmed with UART 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 a convenient platform for mobile devices.





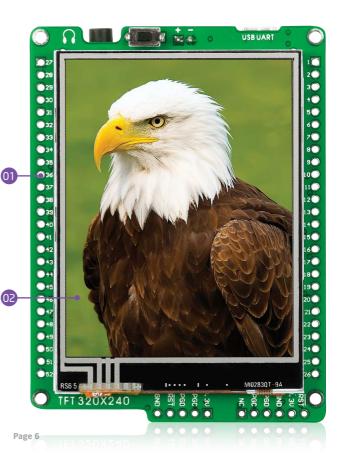


Package contains



Key features

- 01 Connection pads
- 02 TFT 320x240 display
- USB MINI-B connector
- 04 CHARGE indication LED
- 05 LI-Polymer battery connector
- 3.5mm headphone connector
- 07 Power supply regulator
- 08 FTDI chip
- 09 Serial flash memory
- 10 RESET button
- 11 VS1053 Stereo mp3 coder/decoder
- 2 dsPIC33FJ256GP710A microcontroller
- Accelerometer
- 14 Crystal oscillator
- 15 Power indication LED
- 16 microSD card slot
- 17 ICD2/3 connector
- 18 mikroProg connector





System specification



CONSUMPTIO

power supply Via USB cable (5V DC)

power consumption

77 mA with erased MCU (when on-board modules are inactive)

board dimensions 81.2 x 60.5 mm (3.19 x 2.38 inch)



CE

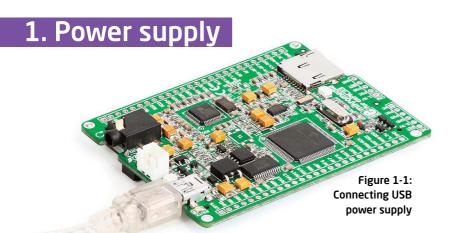
weight ~50g (0.11lbs)

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.

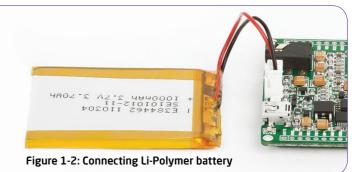


USB power supply

You can apply power supply to the board using **MINI-B USB** cable provided in the package. 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 a Li-Polymer battery, via on-board battery connector. On-board battery charger circuit MCP73832 enables you to charge the battery over a USB connection. LED diode (RED) will indicate when the battery is charging. Charging current is ~250mA and charging voltage is 4.2V DC.



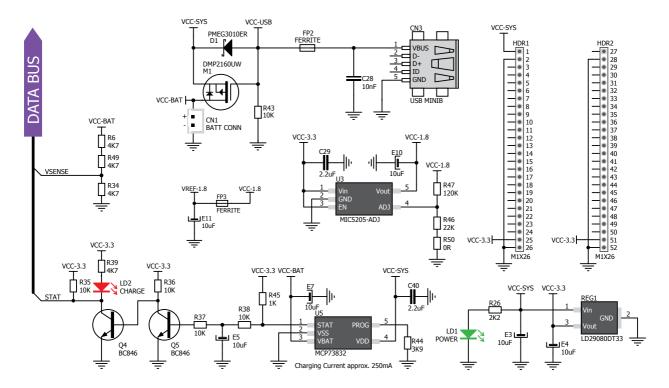


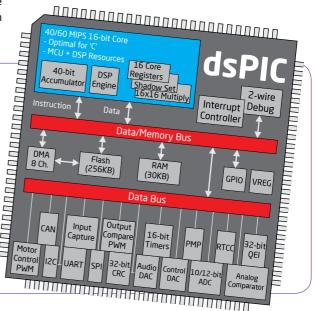
Figure 1-3: Power supply schematics

2. dsPIC33FJ256GP710A microcontroller

mikromedia for dsPIC33[®] development system comes with the **dsPIC33FJ256GP710A** 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 40 MIPS Operation;
- 16-bit architecture;
- 256KB of program memory;
- 30.720 Bytes of RAM;
- 85 I/O pins;
- Internal Oscillator 7.37 MHz, 512kHz;
- nanoWatt features: Fast Wake/Fast Control;
- 2-UART, 2-SPI, 2-I2C, 2-CAN;
- DAC, ADC, etc.



3. Programming the microcontroller



The microcontroller can be programmed in three ways:



Over UART bootloader

2 Using mikroProg[™] external programmer

Using ICD2/3 external programmer

Programming with mikroBootloader

You can program the microcontroller with the bootloader which is preprogrammed into the device by default. To transfer .HEX file from a PC to MCU you need bootloader software (**ds30 Loader**) which can be downloaded from:



www.mikroe.com/eng/downloads/get/1493/ mikrommb_dspic33_bootloader.zip

Upon download, unzip the file to the desired location and start ds30 Loader software.



🚽 ds30 Loader			[inc	-
File View	Help			
🕐 Write 💿	Abort			
Basic				
Hex-file:	l			·
Device:	+			•
Baud rate:	9600 -	Port:	Communicat	ions Por 👻
🔲 Write pr	14 77 12009-0			
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Copyright © 08	i-11, Mikael Gu	istafsso	n	1,4.1

Figure 3-1: ds30 Loader open-source software



Connect mikromedia for dsPIC33° with a PC before starting ds30 Loader software

Identifying device COM port

🚔 Device Manager 📃 📃	×
File Action View Help	
(= -) 🖬 🛛 🖬 🖉	
 ▷ · ⑧ Mice and other pointing devices ▷ · ● Monitors ▷ • ● Network adapters 	^
Ports (COM & LPT) Ormunications Port (COM1) Printer Port (LPT1)	1.0
USB Serial Port (COM5)	W
 J = Sound, video and game controllers J = System devices J = Universal Serial Bus controllers 	
	+

Figure 3-2: Identifying COM port



In Device Manager you can see which COM port is assigned to mikromedia (in this case COM5)

step 1 - Choosing COM port

File View Help Write Abort Basic Hexfile: Device: Baud rate: 9600 Port: Serial Port (COM5) Write program Write program Vite Eeprom Loading device database492 devices found Loading port plugin ds 30LoaderPortSerial.dll: found 2 ports Loading settingsok	🖳 ds30 Loader		
Basic Hexfile: Device: Baud rate: 9600 Port: Senal Port (COM5) Communications Port (C USB Senal Port (CON5) Write program Write Eeprom Loading device database492 devices found Loading device database492 devices found Loading port plugin ds30LoaderPort Senal.dl: found 2 ports	File View Help		
Write Eeprom Loading device database492 devices found Loading port plugin ds30LoaderPortSenial.dll: found 2 ports	Basic Hex-file: Device: Baud rate: 9600	Communications Port (C(-0
	Loading device databas Loading port plugin ds3		

Figure 3-3: Selecting COM port



From drop down list select USB COM port which is used for communication with a PC (in this case COM5)

step 2 - Choosing device family

🕐 Write 💿 Abort	
Basic	
Hex-file:	▼ []
Device:	•
Baud rate: dsPIC30F	Port: USB Serial Port (CO 👻
PIC12F Write p PIC16F	
Write E PIC18F	
PIC24F PIC24FJ	devices found
Loading devic PIC24HJ Loading port p PIC32MX Loading settingsok	PortSerial.dll: found 2 ports
Loading settingsok	Y
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	()

Figure 3-4: Selecting MCU family



From drop down list select MCU family (dsPIC33FJ)

step 3 - Choosing device

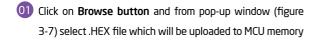
File View Help		
🕐 Write 🔘 Abort		
Basic		
Hex-file:		•
Device: dsPIC33FJ 👻	06GS101	+
Baud rate: 9600 👻	12MC202 16GP304	-
Write program	16GS402 16GS404	h
Write Eeprom	16GS502	-
	16GS504 16MC304	
Loading device database492 d	256GP506	E E
Loading port plugin ds30LoaderP	256GP510	/
Loading settingsok	256GP510A 256GP710	
	256GP710A	
	256MC510 256MC510A	A.
	256MC710 256MC710A	= 1
	0000000	
opyright © 08-11, Mikael Gust	32GP204 32GP302	1.3
ure 3-5:	32GP304	
ecting MCU chip	32GS406 32GS606	

Page 14

step 4 - Browse for .HEX file

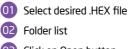
Basic	Abort				
Hex-file:	-			•	
Device:	dsPIC33FJ	2566	iP710A		•
Baud rate:	9600 -	Port:	USB Serial	Port (CO	-
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🔲 Write I	Eeprom				
b 1 -	1.1.1		<i>L</i> 1		
	ce database49) olugin ds30Loade			2 ports	\bigvee
odding settin	igaok				X
					1

Figure 3-6: Browse for .HEX file



	examples Calculator	▼ 4 9 S	earch Calo	viator	
Organize 🔻 New folder				III • 🔲	(
Libraries Documents Music Pictures Videos	tor.hex	Date mod 28/12/201		Type HEX File	
Computer Local Disk (C:) Local Disk (D:) mikro (E:)					
🕞 Local Disk (I:)					
Local Disk (K:)	m				

Figure 3-7: Pop-up window for .HEX file choosing



Click on Open button

step 5 - Set Baud rate

	v Help		
🔶 Write 🌔	Abort		
Basic			
Hex-file:	E:\mikrommb_	dspic33_r	nikroc\mikroMM 👻 🛄
Device:	dsPIC33FJ	▼ 256G	iP710A 👻
Baud rate	256000	Port:	USB Serial Port (CO 👻
🗌 Write	Eeprom		
Parsing hex-f File times Validating Hex-file s		ed	

Figure 3-8: Seting baud rate



From drop down list set baud rate value to 256000

Check Write program check box

step 6 - Uploading .HEX file

🚽 ds30 Loade	r			
File View	Help			
🔮 Write 🗔 Basic	Abort			
01 Hex-file:	E:\mikrommb_c	dspic33_i	mikroc\mikroMM 👻	
Device:	dsPIC33FJ	2560	iP710A	•
Baud rate:	256000	Port:	USB Serial Port (CC	•
Parsing hex-fil File timest Validating	Eeprom e amp: 28/12/201 hex.fileok uccessfully parse		20	
0 Eeprom	gram words four words found vords found	nd in 290	rows	
Copyright © 0	8-11, Mikael G	ustafsso	n	1.4.1

Figure 3-9: Write program



First RESET mikromedia and then, within 5s

click on Write button

note

If you accidently erase bootloader program from MCU memory it is possible to load it again with external programer. mikromedia for dsPIC33[®] bootloader firmware.hex file is located in Firmware subfolder, Page 12.

Hex-file:	E:\mikrommb_c	lspic33_1	nikroc\mikroMM +
Device:	dsPIC33FJ v	2563	iP710A *
Baud rate:	256000	Port:	USB Serial Port (CO 👻
nitiating write Searching			

Figure 3-10: Program uploading



Progress bar indicates .HEX file upload process

	Help					
👌 Write 💿	Abort					
Basic						
Hex-file:	E:\mikrommb_dspic33_mikroc\mikroMM 👻					
Device:	dsPIC33FJ	• 256G	P710A 👻			
Baud rate:	256000	Port:	USB Serial Port (CO 👻			
Write p	Eeprom		100000			
Initiating write Searching Found dsl	Eeprom Infor bl . PIC33FJ256GP 7 r bootloader to b shok					

Figure 3-11: Uploading is finished



After uploading is finished you will get a

notice in ds30 Loader history window

Programming with mikroProg[™] programmer

The microcontroller can be programmed with **mikroProg**[™] **programmer** and **mikroProg Suite[™] fo PIC**^{*} software. The mikroProg[™] programmer is connected to the development system via the CN6 connector, Figure 3-12.

> mikroProg[™] is a fast USB 2.0 programmer with mikroICD[™] hardware In-Circuit Debugger. Smart engineering allows mikroProg[™] 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.

Figure 3-12: Connecting mikroProg[™] to mikromedia[™]

mikroProg Suite[™] for PIC[®] software



mikroProg[™] programmer requires special programming software called mikroProg Suite[™] for PIC[®]. This software is used for programming 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.

Ankonog Suik for FC i Sik USS hie Manualis Ostrach Picter No Resd Virite Resd Virite Resd Virite Resd Virite Resd Virite Resd Sive LaddShalk V.LadShare CODE V.LadShare CODE V.LadShare CODE	V230 1 by mikroElectronika Configuration Bits Oscillator 4 × PLL Enable bit Fail-safe CLK Monitor Brown Out Oktage Brown Out Detect Power Up Timer Watchdog Postscale Watchdog Fostscale Watchdog Timer MCLR Enable Bit CCP2 B Output HUX bit TGCHX TGCHX FF FF FF FF FF FF	Primary Clock is entry Disabled Disabled 2:05 V HW Enabled Disabled 1:32763 WDT enabled in hardware; SWDTEN bit MCLR Enabled, RE3 Disabled P28 is on RD2 1:30KI is on RC0 Wether the case 4 default		Code Prote Data EEROM Code 0000-007FF Code 0000-007FF Code 0000-05FFF Code 0400-05FFF Code 0600-07FFF Code 0600-07FFF Code 0000-007FF Code 0000-007FF Code 0000-007FF Code 00000-007FF Code 0000-007FF Code 00000-007FF Code 00000-007FF Code 00000-007FFF Code 00000-07FFF Code 00000-07FFF Code 00000-07FFF Code 00000-07FFF Code 00000-07FFF Code 00000-07FFF Code 00000-07FFF	m
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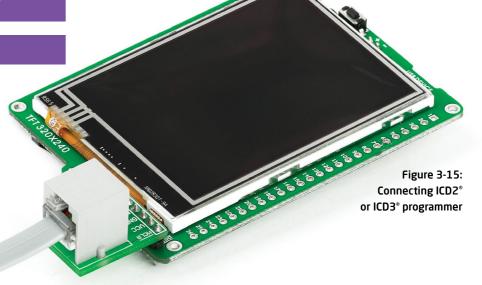
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Programming with

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.**



In order to enable the ICD2^{*} and ICD3^{*} programmers to be connected to the development system, it is necessary to provide an 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 3-14.

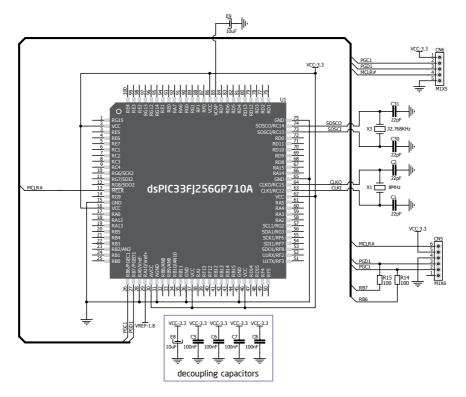


Figure 3-16: ICD2 / ICD3 & mikroProg[™] programmer connection schematics

4. Reset buttons

Board is equipped with a 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 a low voltage level on the microcontroller reset pin (input). In addition, a reset can be externally provided through **pin 27** on side headers (**Figure 4-3**).

Note You can also solder an additional reset button on the appropriate place at the back side of the board, **Figure 4-1**.

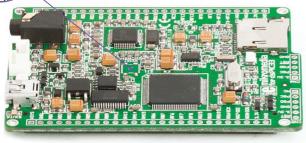


Figure 4-1: Reset button located at the backside of the board



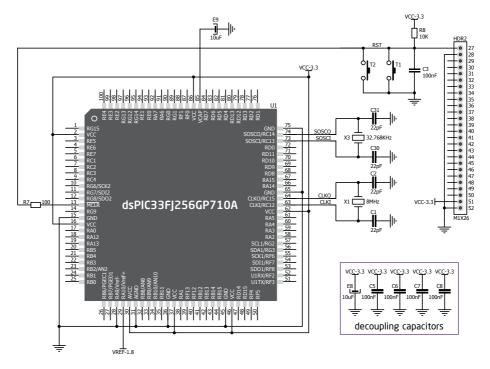


Figure 4-3: Reset circuit schematics

5. Crystal oscillator



Figure 5-1: Crystal oscillator module (X1)

Board is equipped with an **8MHz crystal oscillator (X1)** circuit that provides external clock to the microcontroller OSC pins. This base frequency is suitable for further clock multipliers and ideal for generation of the 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 the internal **RTCC** module.



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

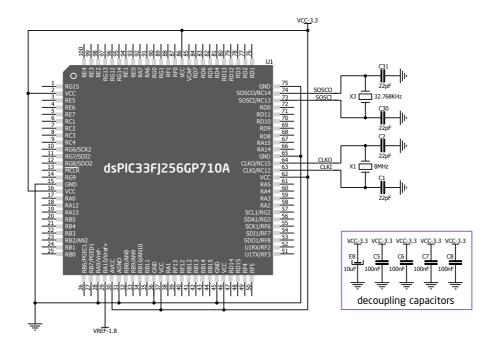


Figure 5-2: Crystal oscillator schematics