

General Description

The mainboard of the epc600/610 Evaluation Kit is a fully assembled and tested circuit for the evaluation of the epc600 and epc610 time-of-flight (TOF) products.

The mainboard is divided in two independent sections:

The “Evaluation” main section is equipped with a STM32 ARM Cortex microcontroller. This section provides a powerful and flexible development environment for the design engineer. It supports all available camera modules and works with both the epc600 TOF Range Finder and the epc610 TOF Imager Chip.

The second part of the mainboard, for the “Application with PIC10F”, is equipped with a PIC10F206 microcontroller. It serves as a standalone demonstration system and has a simple distance gauge application implemented. It works with the epc600 Range Finder product only.

The separate camera modules come either with an epc600 TOF Range Finder chip or with an epc610 TOF Imager chip. The modules include active LED illumination for the observation area, a complete lens system and have a cable interface to the mainboard, allowing a flexible and convenient placement in a lab setup.

Features

- Complete development system for applications using epc600 TOF Range Finders and epc610 TOF Imagers.
- Dual controller environment with STM32 and PIC10F206 micro-controllers.
- Designed for use with different camera modules with either an epc600 or an epc610 chip.
- For epc600: Standalone operation demonstrator with pushbutton and indicator LED.
- PC connectivity and power supply by USB.
- Corresponding user software (PC/Mac) with visualization and logging features as part of the camera system.

Purpose

- Performance demonstration of epc's 3D TOF technology in terms of speed, accuracy and operating range.
- Speed: Integration time, response time.
- Accuracy: Distance noise, distance drift, absolute distance accuracy.
- Operating range: Sensitivity, ambient-light suppression.
- Reference application for evaluation and design engineers.

System overview

- ① Mounting place epc600 Camera
- ② Camera module connector
- ③ Application / evaluation switch
- ④ STM32 ARM Cortex controller
- ⑤ USB connectors
- ⑥ Dip switch and LED bank Application
- ⑦ 10 pin Cortex debug connector
- ⑧ PIC10F206 controller
- ⑨ Push-button / LED interface
- ⑩ ICD3 In-Circuit debugger interface



Figure 2: Camera module e.g. epc600 Camera

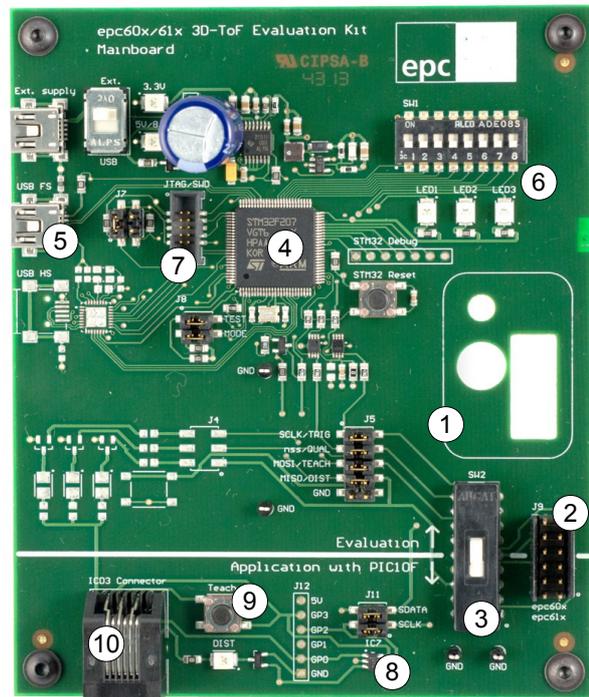


Figure 1: Mainboard V1.2

! IMPORTANT INFORMATION !

SAFETY ADVICE

DO NOT LOOK DIRECTLY INTO THE CAMERA UNDER OPERATION !

Depending on the mode of operation, the camera device emits highly concentrated non-visible infrared light. It can be hazardous to the human eye. The use of these devices has to follow the safety precautions given in IEC 60825-1 and IEC62471.

THIS EVALUATION KIT SHOULD ONLY BE INSTALLED AND USED BY AUTHORIZED AND FULLY TRAINED PEOPLE. ALL INSTRUCTIONS IN THIS MANUAL AND IN THE RELATED DOCUMENTS HAVE TO BE FOLLOWED AND FULLY COMPLIED WITH. IN ADDITION, THE INSTALLER AND USER IS REQUIRED TO COMPLY WITH ALL LOCAL LAWS AND REGULATIONS. SHOULD ANY OF THESE INSTRUCTIONS NOT BE CAREFULLY FOLLOWED, SERIOUSLY INJURY MAY OCCUR. THE INSTALLER AND USER IS FULLY RESPONSIBLE FOR THE SAFE USE AND OPERATION OF THE SYSTEM. IT IS THE SOLE RESPONSIBILITY OF THE INSTALLER AND THE USER TO ENSURE THAT THIS PRODUCT IS USED ACCORDING TO ALL APPLICABLE CODES AND STANDARDS IN ORDER TO ENSURE SAFE OPERATION OF THE WHOLE APPLICATION.

ANY ALTERATION TO THE DEVICES BY THE BUYER, INSTALLER OR USER MAY RESULT IN UNSAFE OPERATING CONDITIONS.

ESPROS photonics AG IS NOT RESPONSIBLE FOR ANY LIABILITY OR WARRANTY CLAIM WHICH RESULTS FROM SUCH MANIPULATION.

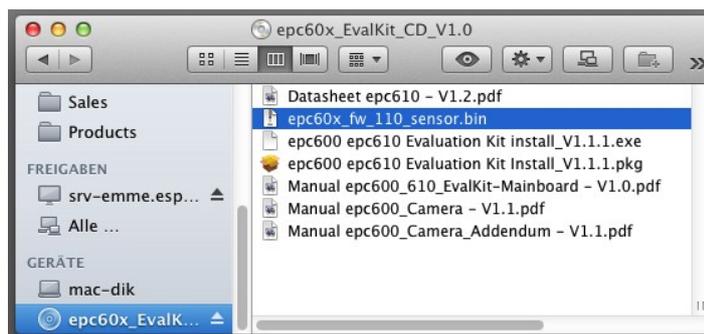
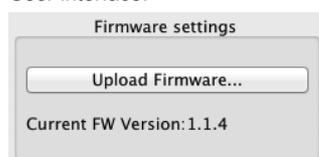
THIS DEVICES MAY NOT BE USED FOR APPLICATIONS OTHER THAN THE EVALUATION OF THE DESIGNATED DEVICES. THIS DEVICES MAY NOT BE USED IN SAFETY APPLICATIONS, EXPLOSIVE ATMOSPHERES, OR IN A RADIOACTIVE ENVIRONMENT.

! IMPORTANT INFORMATION !

THIS CAMERA COMES WITH ITS OWN CALIBRATED FIRMWARE.

For proper operation of the Evaluation Kit upload the correct firmware from the CD ROM to the evaluation board. Do this each time, when you are changing the camera head.

User interface:



Use the dialog "Firmware settings"

Upload the binary file "epc60x_fw_xxx_sensor"

**ALSO, MAKE SURE THAT YOU ALWAYS USE THE LATEST SOFTWARE VERSION ON YOUR MAC / PC.
USE THE APPROPRIATE INSTALLER THAT IS ALSO ON THE CD.**

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1. General overview of the epc600/610 Evaluation Kit

The chapter gives an overview about the epc600/610 Evaluation Kits, their components and the technical data of the mainboard.

1.1. Ordering information

	Part number	Order information	Description
Kits	P100 110	epc600 Evaluation Kit Spot	Evaluation kit set with an epc600 TOF Range Finder chip <ul style="list-style-type: none"> - epc600 Camera Spot - epc600/610 Evaluation Kit Mainboard
	P100 227	epc610 Evaluation Kit Wide	Evaluation kit set with an epc610 TOF Imager chip <ul style="list-style-type: none"> - epc610 Camera Module V1.0 - epc600/610 Evaluation Kit Mainboard
Accessories	P100 113	epc600 Camera Spot	Camera module with an epc600 TOF Range Finder chip with 1.4° x 1.4° optical aperture angle, including cable
	P100 223	epc610 Camera Module V1.0	Camera module with an epc610 TOF Imager chip with 8.7° x 8.7° optical aperture angle, including cable

Table 1: Order information overview

1.2. Scope of delivery

No	Pieces	Designation	Kit	Camera
①	1	Camera module according the order code (see above Table 1) e.g. epc600 camera with stand-off (or epc610 camera module)	Yes	Yes
②	1	Cable to connect the camera with the mainboard	Yes	Yes
③	1	epc600/610 Evaluation Kit mainboard	Yes	
④	1	USB type 2 cable to connect the mainboard with a computer	Yes	
⑤	1	CD-ROM with the application software + documentation	Yes	Yes
	1	Manual epc600 Camera or epc610 Camera; on CD-ROM; according the order code (see above Table 1)	Yes	Yes
	1	Manual epc600/610 Evaluation Kit; on CD-ROM; according the order code (see above Table 1)	Yes	

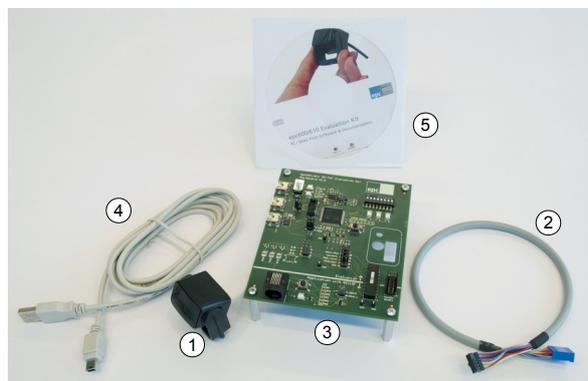


Figure 3: Material of the complete kit e.g. epc600 Evaluation Kit Spot

1.3. System requirements

For the applicable system requirements for the Evaluation Kit refer to the corresponding camera manual

1.4. Technical data epc600/610 Evaluation Kit mainboard V1.2

Note:

epc600/610 Evaluation Kit mainboard V1.2 is a epc600/610 Evaluation Kit mainboard V1.1 with an extended power supply for the epc610 Camera Module.

Description	Data	Remarks
Processor 1	STM32F207VG (ST Microelectronics) ■ Core: ARM 32bit Cortex – M3 120MHz / 150DMIPS ■ Program memory Flash: 1024 kByte ■ Data memory RAM: 132 kByte	Evaluation and visualization system for epc600 and epc610 cameras
Processor 2 (tiny microprocessor)	PIC 10F206 (Microchip) ■ Program memory Flash: 512 word ■ Data memory RAM: 24 byte	Standalone demonstration system for epc600 cameras only
Supply voltage USB-connection: external:	+5V DC ± 5% +5V DC ± 5%, 1'000mA	by USB computer connection by external USB power supply
Power consumption	typ. 2.0W typ. 0.6W	with camera module epc without camera module
Communication PC – evaluation board	USB 2.0 full speed	max. cable length: 2m
Communication evaluation board - camera	epc600: 2-wire interface, max. 1Mbit/s epc610: SPI interface (4-wire), max. 10Mbit/s	max. cable length: 0.5m
Dimensions (length x width x height)	120 x 100 x 15mm	
Temperature range; Humidity	0° ... 45°C; 20% ... 80% RH	
CE certificate	The Evaluation Kit is designed as a module level device. Therefore it is not a CE certified device. It is the users responsibility to operate the hardware in compliance with the CE regulations.	
RoHS	Fulfills 2002/95/EC	

Table 2: Technical data mainboard

1.5. Support and technical contact

If you need more information, please contact us at info@espros.ch.

2. Hardware

2.1. Block diagram

The system consists of 3 main parts: A personal computer, the mainboard of the Evaluation Kit and a camera module (refer to Figure 4)

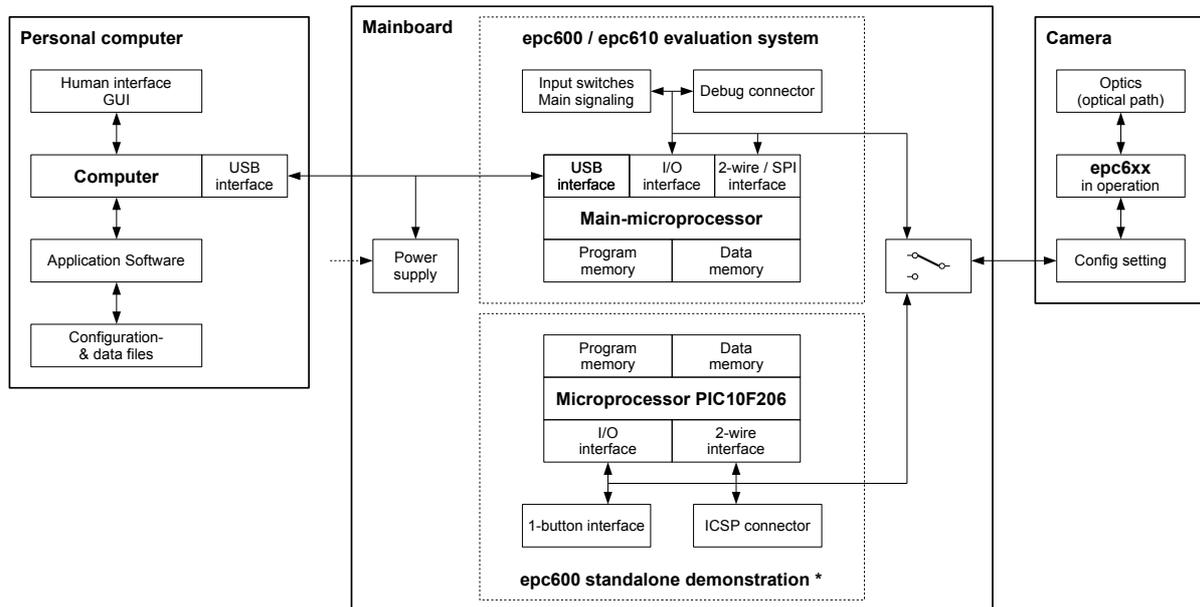


Figure 4: Block diagram (* not implemented)

The Personal computer

- IBM compatible or Apple (Mac).
- Man-machine interface for operation and visualization of the evaluation system.
- Runs the application software.
- Stores, reads and writes configuration and data files for the application.
- Host system for ST ARM 32bit Cortex microprocessor software development.

The mainboard

- Two sections with independent microprocessor systems:
 - The one for the “epc600 / epc610 evaluation system” (Evaluation)
 - The second is a minimal hardware design concept for a Range Finder application with the epc600 (Application with PIC10F).
- A main switch selects which section will be connected to the camera module.
- The mainboard/system is connected to the computer by a USB cable for data communication and power supply.
- The power supply generates all of the necessary supply voltages from the USB connection. An additional external USB power supply can be added if the PC USB interface is not capable of delivering the necessary power (ca. 1'000mA).
- The “epc600/epc610 evaluation system” section supports and gives access to the full functionality of the epc600 / epc610 devices.
 - Checks for the correct device identification of the camera.
 - Configures and controls the camera.
 - Reads the picture data from the camera and sends it via USB to the computer.
 - Provides configuration DIP switches and signaling LEDs.
 - A “debug connector” allows advanced users to download their own application. For more information, refer to the manual of the corresponding processor.
- The “epc600 standalone demonstration” section with a tiny microprocessor PIC10F206 is a fully functional range-finder concept.
 - This part is not yet supported. There is no functional firmware implemented.

The camera module

- Is a fully functional module with an epc600 or epc610 chip and optics combined.
- Connects to the mainboard for power supply, data communication and configuration reading.
- The configuration setting in the camera can be read back, allowing identification of the type of the chip in the camera.
- Has a built in epc600 or epc610 chip according the label.
- Appropriate optics allow for the demonstration of the functionality of the epc600 or epc610 device.
 - The transmit and receive optics guarantees having a fully functional camera system from the start.

Goals and objectives of this Evaluation Kit:

- Easy-to-use, plug and play demonstrator to show how epc's TOF products work and which possibilities they offer.

- Test kit for engineers, enabling first contact with epc's products.
- Reference design kit for design and development engineers.
- Supports the user during development and testing of his own hard- and software.

Exceptions of this kit:

- The kit is a demonstrator. It is not designed for verification of datasheet parameters. Such tests need a dedicated test environment.
- Not designed for use in final applications.

2.2. Schematics

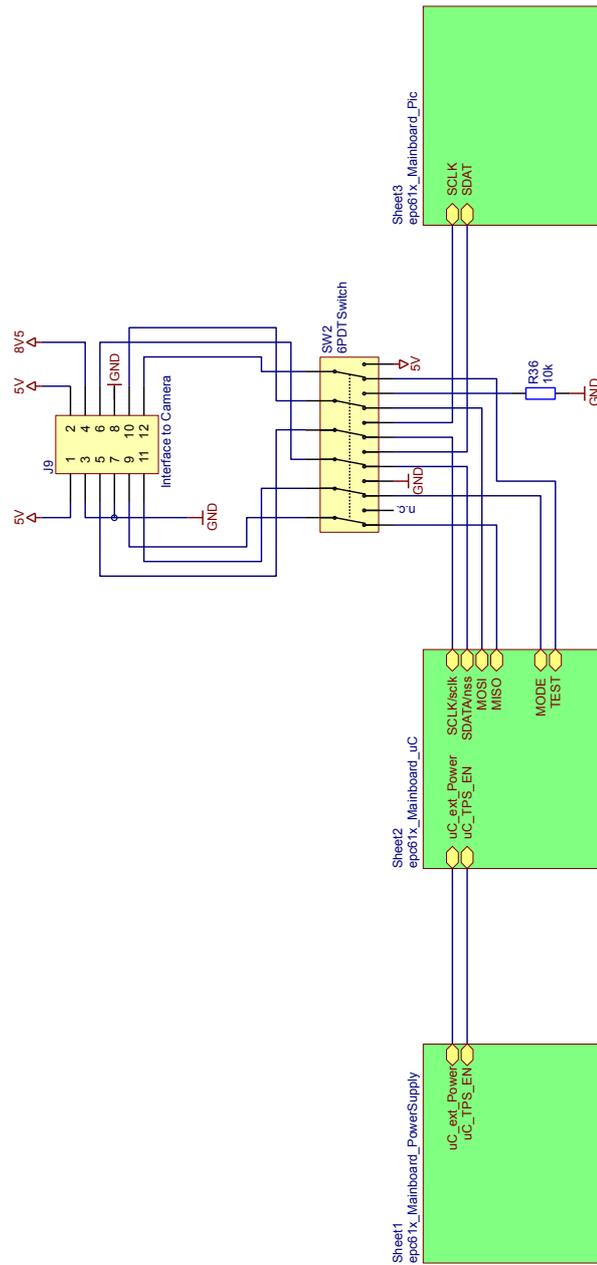


Figure 5: Overview and camera interface

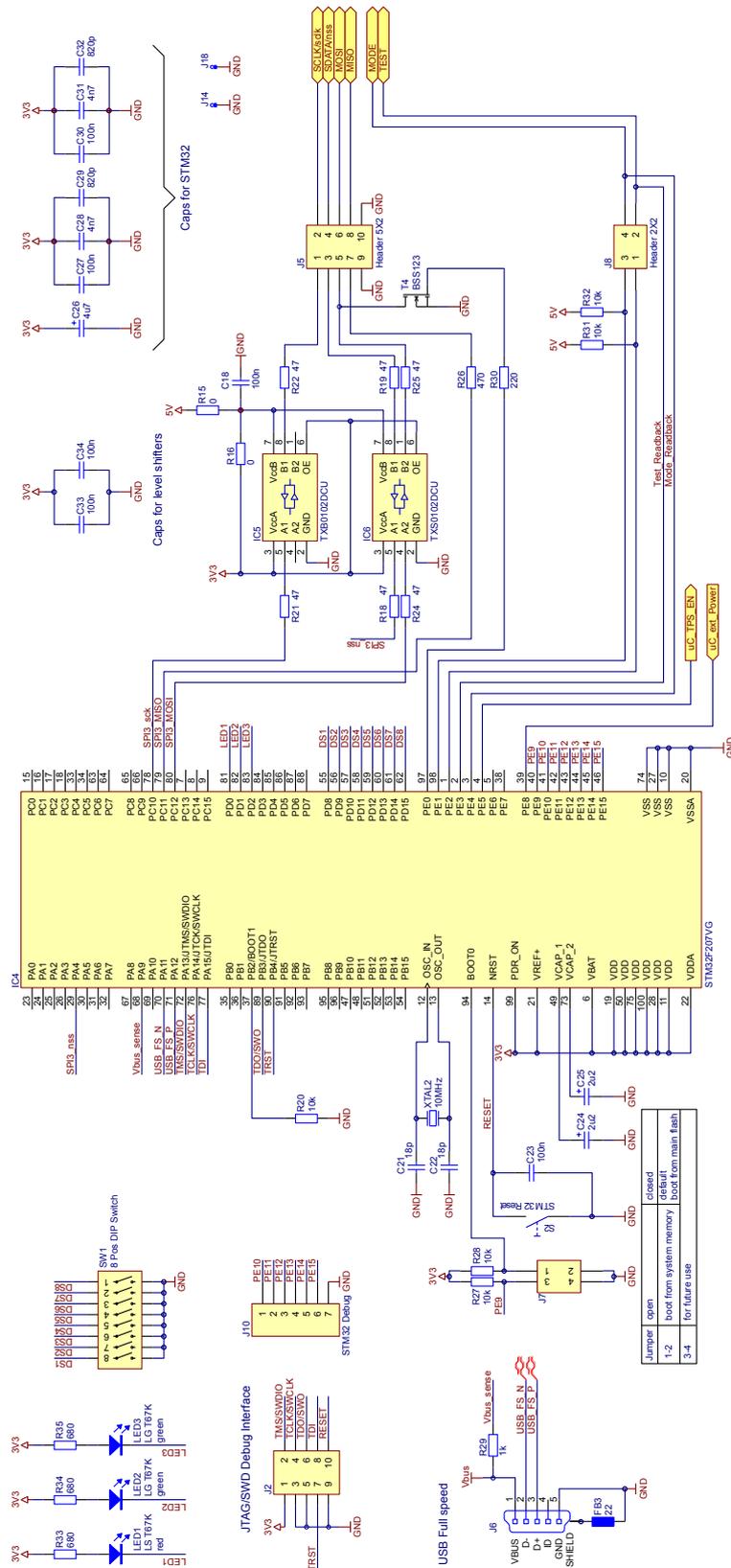


Figure 6: Sheet2 epc61x_Mainboard-uC

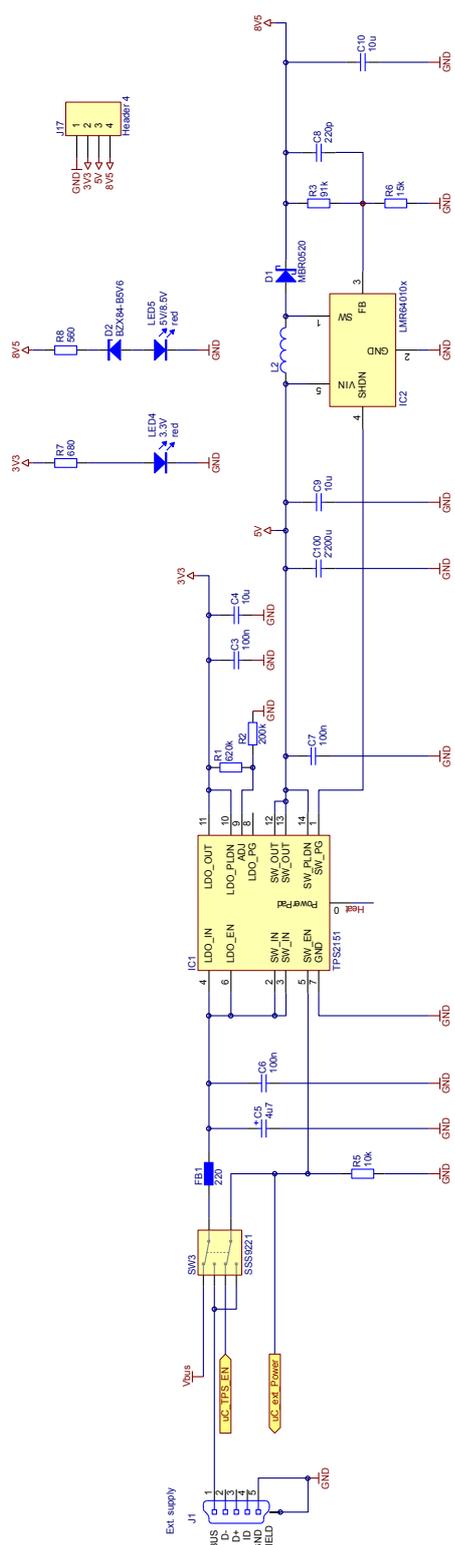
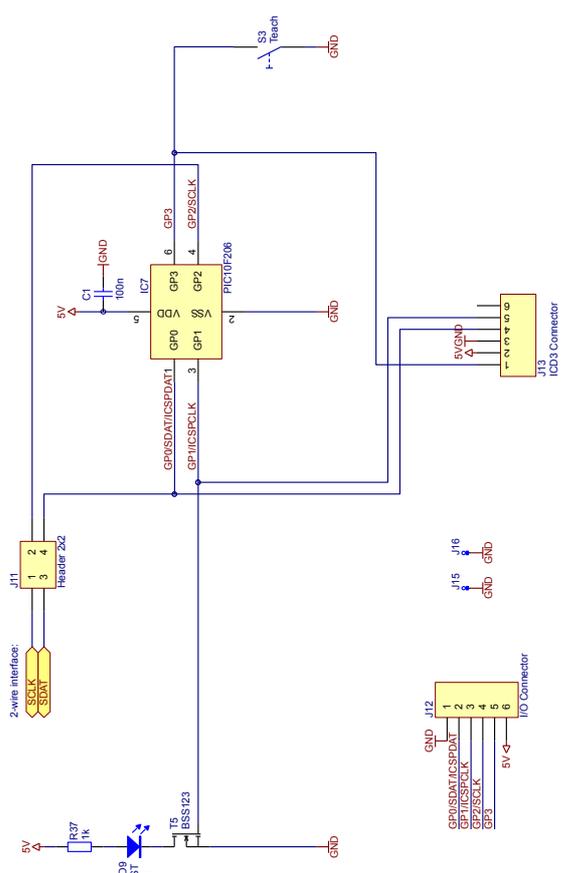


Figure 7: Sheet1 epc61x_Mainboard_PowerSupply



PIC Programming: board is working in the PIC mode.
Disconnect chip carrier for safety reasons.

Figure 8: Sheet3 epc61x_Mainboard_Pic

2.3. Assembly & part list

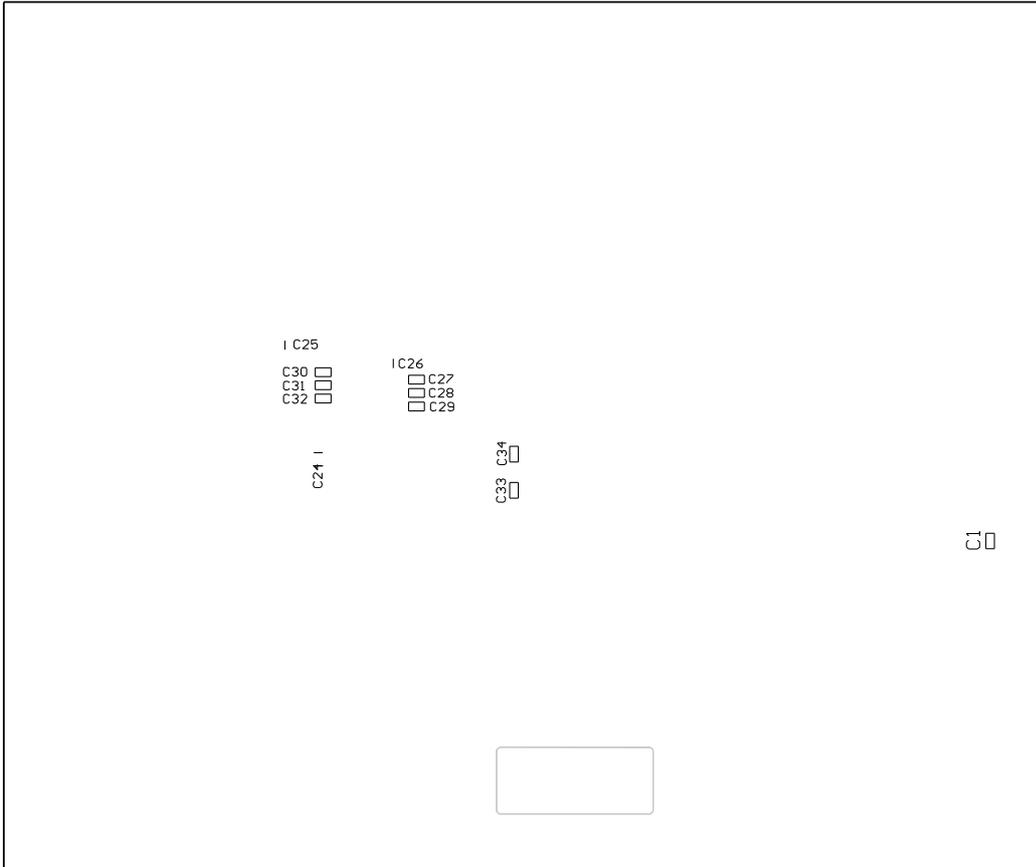


Figure 9: Backside assembly

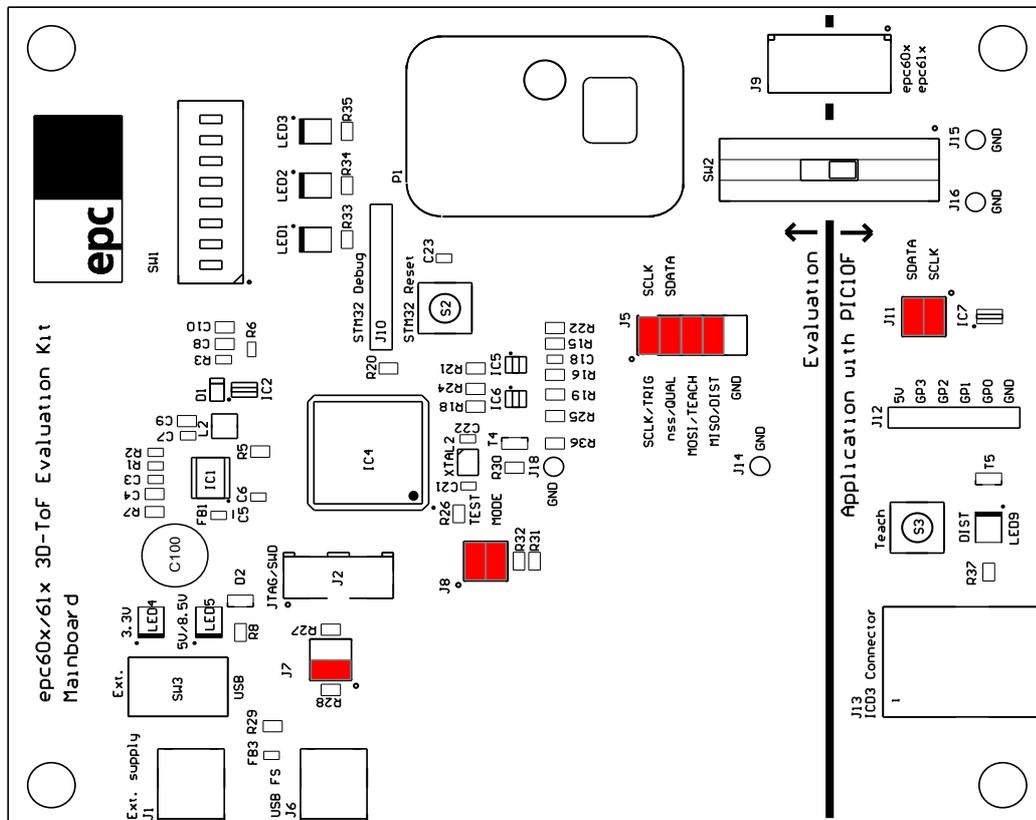


Figure 10: Frontside assembly and default jumper setting

Device	Value (typical)	Comment
C1, C3, C6, C7, C18, C23, C27, C30, C33, C34	100 nF	Capacitor, X7R, 10%, 10V
C4, C9, C10	10 µF	Capacitor, X5R, 10%, 10V
C5, C26	4.7 µF	Capacitor, polarized
C8	220 pF	Capacitor, 10%
C21, C22	18 pF	Capacitor, 5%
C24, C25	2.2 µF	Capacitor Polarised
C28, C31	47 nF	Capacitor, X7R, 10%, 10V
C29, C32	820 pF	Capacitor, X7R, 10%, 10V
C100	2'200 µF	Capacitor, 16V
D1	MBR0520	Schottkydiode
D2	BZX84-B5V6	Zenerdiode
FB1	220 Ohm @ 100MHz	Ferrit bead (732-1581-1-ND, Würth)
FB3	22 Ohm @ 100MHz	Ferrit bead (732-1597-1-ND, Würth)
IC1	TPS2151	LDO and switch with dual current control
IC2	LMR64010x	1A step up SIMPLE SWITCHER
IC4	STM32F207VG	32bit ARM controller with FPU
IC5	TXB0102DCU	2-bit bidirectional voltage level translator
IC6	TXS0102DCU	2-bit bidirectional voltage level translator
IC7	PIC10F206	PIC10F20x, SOT23-6 Package
J1, J6	USB Mini B	USB Mini B receptacle
J2	JTAG/SWD	1.27mm dual row header
J5	Header 5X2	Header, 5-Pin, Dual row
J7, J8, J11	Header 2X2	Header, 2-Pin, Dual row
J9	Dubox 2x6	Header, 6-Pin, Dual row
J13	ICD3 Connector	RJ11 Connector 90°
J14, J15, J16, J18	Testpoint	Testpoint
L2	33 µH	Inductor
LED1, LED4, LED5, LED9	LS T67K	LED red 2mA 1.9V
LED2, LED3	LG T67K	LED green 2mA 1.9V
R1	620 kOhm	Resistor, 1%, 1/10W
R2	200 kOhm	Resistor, 1%, 1/10W
R3	91 kOhm	Resistor, 1%, 1/10W
R5, R20, R27, R28, R31, R32, R36	10 kOhm	Resistor, 1%, 1/8W
R6	15 kOhm	Resistor, 1%, 1/10W
R7, R33, R34, R35	680 Ohm	Resistor, 1%, 1/8W
R8	560 Ohm	Resistor, 1%, 1/8W
R15	0 Ohm	Resistor, 1%, 1/8W
R18, R19, R21, R22, R24, R25	47 Ohm	Resistor, 1%, 1/8W
R26	470 Ohm	Resistor, 1%, 1/8W
R29, R37	1 kOhm	Resistor, 1%, 1/8W
R30	220 Ohm	Resistor, 1%, 1/8W
S2, S3	Pushbutton	Pushbutton
SW1	8 Pos DIP Switch	8 Pos DIP Switch
SW2	6PDT Switch	6PDT Switch
SW3	SSS9221	Switch DPDT
T4, T5	BSS123	NMOS Transistor
XTAL2	10 MHz	Quartz Crystal, SMT

Table 3: Part list

2.4. Mainboard overview

The mainboard is divided into two areas with independent functionality.

In the „Evaluation“ area (the upper part of the board) is the “epc600/610 evaluation system” It contains the USB interface, the main-micro-processor of the evaluation system, some I/O features and the 3.3 -> 5V level-shifting for the communication and I/O lines from the micro-processor to the I/Os of the epc600 and epc610 devices.

The „Application with PIC10F“ area (the bottom part of the board) is not used for the Evaluation Kit currently. It contains a typical range-finder application with a tiny PIC10F206 microcontroller.

General purpose functions are the power supply on the top of the board, the camera connector and the evaluation/application switch in between the two main areas.

2.5. General purpose functions on the Mainboard

2.5.1. Board supply

Usually, the mainboard is supplied by the host (PC, USB Hub) over the USB cable (Figure 11, J6/USB FS).

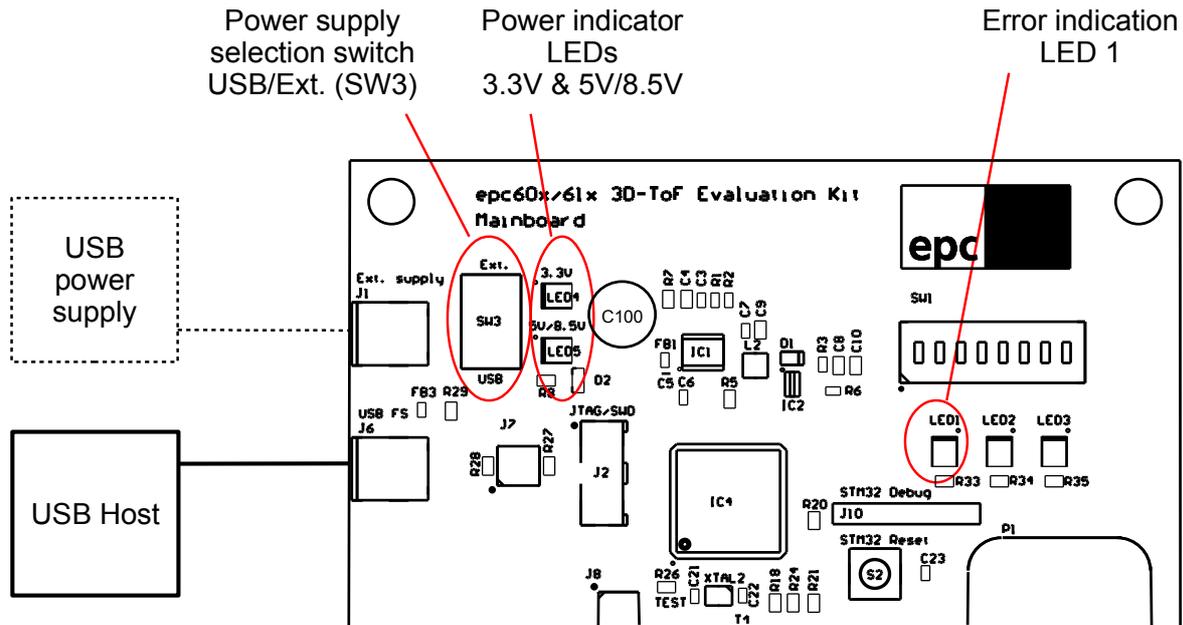


Figure 11: Mainboard: Power supply function

An integrated power management module with a built in power switch is used to manage the supply of the board. As soon as the board is connected to a USB interface or to an external USB supply, the main-microprocessor is supplied with 3.3V. The switch is initially open and the 5V or 8.5V supplies are not available until the main-microprocessor had asked the host for high-power devices and has closed the switch.

If the host is not able to deliver the necessary power, the mainboard indicates an error by blinking LED1. In this case, or if the system is running without a host, the external USB Power Supply (5V, 1'000mA) needs to be used with the power supply selection switch USB/Ext. (SW3; see picture below) set to Ext for the external supply through connector J1.

Position	Description
USB (default)	The Evaluation Kit is supplied by the host over the USB FS connector.
Ext.	The Evaluation Kit is supplied by an external USB power supply over the Ext. suppl connector.

Table 4: Power supply selection switch SW3

LED 3.3V and LED 5V/8.5V indicate if the corresponding voltages are available.

All voltages can be accessed over the power supply test points (see Figure 11). The external circuitry may not draw more than 2.5W in total!

Note:

If the following pop-up window appears after “Connect”:



Figure 12: FW boot-up

Reason:

You are using a 1st series camera module with a V1.2 or V2.0 mainboard. The USB power supply is not compatible

Solution:

Use an external 1'000mA USB supply. Connect it to the appropriate plug on the mainboard and switch to „Ext.“ power supply. After power-up press the reset button on the mainboard.

2.5.2. epc600 camera (place P1)

For easier testing and demonstration, the epc600 camera can be fixed on the mainboard with a screw at location P1.

Note:

The camera must be connected via the camera cable to connector J9 of the mainboard (No direct interconnects).

2.5.3. Camera connector J9

Depending of the type of the camera module or with respect to the sensor chip inside a camera, the pins of the J9 camera connector have different meanings and need different terminations according to Table 5. For camera modules supplied by ESPROS photonics, the pin assignment is already done for the correct operation of the module in combination with the mainboard.

Pin	Pin assignment	
	Camera module epc600	Camera module epc610
1	+5V	+5V
2	+5V	+5V
3	GND	GND
4	+8.5V	+8.5V
5	SCLK	SCLK
6	SDATA	nSS
7	GND	GND
8	GND	GND
9	not connected	MISO
10	not connected	MOSI
11	GNDM (see notes)	VDDM (see notes)
12	VDDT (see notes)	VDDT (see notes)

Notes:
Pins 11 and 12 must be terminated, but not necessarily in the camera module. If they are not terminated in the camera, the Evaluation Kit reads back the chip type by firmware and terminates them according to the signals MODE and TEST.
For the correct standalone operation of the camera modules (epc600 or epc610), the signals need to be terminated according to the datasheets.

Table 5: Pin assignment camera connector J9

2.5.4. Selection of the working area (SW2)

With the selection switch SW2, the working area of the mainboard can be selected:

- In the upper position, the “Evaluation” area is active for the “epc600/epc610 evaluation system”. This mode works for camera modules epc600 and epc610. The camera is operated and accessed by the Evaluation Kit application software on the user’s computer.
- The lower position of the switch activates the „Application with PIC10F“ option for the “epc600 standalone demonstration”. It is a typical range-finder application with a tiny PIC10F206 microcontroller. It is not in used for the Evaluation Kit currently.

Caution:
The board must be in the unpowered state when switch SW2 is changed!
Otherwise the board or camera may be damaged.

2.6. “Evaluation” working area

The “Evaluation” area offers the following options for evaluation and test purposes:

2.6.1. USB connector USB FS (J6)

This interface is the communication interface between the host (PC or Mac) and the mainboard. The main task is to transmit all the sensor information from the Evaluation Kit to the host as well as to transmit the control and status information to the sensor. Secondly, this interface is used to supply power to the board (refer to chapter 2.5.1: Board supply).

2.6.2. Header J5

Connect or disconnect signals SCLK/SCLK, nss/SDATA, MOSI or MISO. Pins 9 and 10 of J5 are connected to GND (shorted). The epc600 camera modules communicate over the 2-wire interface (SCLK, SDATA) while the epc610 cameras use SPI communication (SCKL, nSS, MOSI, MISO). For additional details, refer to the corresponding chip datasheets.

2.6.3. Header J7 (boot option)

Jumper J7-12 (between pin 1 and 2) is used to pull down the STM32 boot0 signal.
Jumper J7-34 (between pin 3 and 4) is used to pull down STM32’s port pin PE9.

Jumper	Status	Description	Figure
J7-12	closed (default)	Boot from user flash.	
	open	Boot using boot loader located in the system memory. Do not use this option. Use the epc boot loader.	
J7-34	closed	Boot using the epc boot loader. Use the epc boot loader if you want to reprogram the flash memory using the USB FS interface.	
	open (default)	Boot from user flash.	

Table 6: Header J9 (boot option)

For more information about boot configurations, see the STM32F207 reference manual (chapter 6.1: Related documents).

2.6.4. Header J8

Used to connect or disconnect signals TEST and MODE from the main-microprocessor. These signals are used either to read back the hardwired configuration of the camera module or, in case of non-terminated pins, to terminate them according to the software read-back of the chip type designation (epc600/epc610). Refer to Table 5 and the corresponding datasheets (see chapter 6.1: Related documents).

2.6.5. DIP Switch SW1

Not used in this version.

2.6.6. Signal LED1 .. LED3

Functionality defined by the main microprocessor firmware.

- LED1, red: Error indication
- LED2, green: If LED 2 and 3 blinking alternating, the epc boot loader is active.
- LED3, green: If LED 2 and 3 blinking alternating, the epc boot loader is active.

2.6.7. Test point J14

Test point J14 is foreseen to connect ground GND to measurement or test equipment (e.g. to a oscilloscope).

2.7. STM32 support

The mainboard also offers support for software developers writing their own applications.

2.7.1. JTAG / SWD connector (J2)

JATG / SWD pin	Name	Pin description		STM32 pin
		JTAG debug port	SW debug port	
1	3V3			
2	TMS/SWDIO	JTAG Test Mode Selection	Serial Wire Data Input/Output	PA13
3	GND			
4	TCLK/SWCLK	JTAG Test Clock	Serial Wire clock	PA14
5	GND			
6	TDO/SWO	JTAG Test Data output	TRACESWO if async trace is enabled	PB3
7	TRST	JTAG Test Reset		PB4
8	TDI	JTAG Test Data input		PA15
9	GND			
10	RESET	Debug environment reset		NRST

Table 7: JTAG / SWD connector

To program and debug the STM32, an ARM SWJ-DP interface is implemented. It is a combined JTAG and serial wire debug port that enables either a serial wire debug or a JTAG probe to be connected to the target. The port is available on the J2 connector (see Figure 10), which is a standard 10 pin, 1.27mm cortex debug connector (see infocenter.arm.com). For more information about debug support, refer to the STM32F207 reference manual (see chapter 6.1: Related documents).

2.7.2. STM32 debug (J10)

The STM32 debug connector J10 offers access to six STM32 GPIO port pins that can be set for bug tracing or any other use.

Connector Pin	STM32 pin
1	PE10
2	PE11
3	PE12
4	PE13
5	PE14
6	PE15
7	GND

Table 8: JTAG / SWD connector

2.7.3. STM32 reset (S2)

The STM32 reset button S2 is connected to the STM32's NRST input pin. A low level (pressed button) causes a system reset of the controller (for more information refer to STM32F207 reference manual; see chapter 6.1: Related documents). Note that the reset signal is only connected to the STM32 controller.

2.8. "Application with PIC10F"

This section is not used and in operation for the Evaluation Kit currently.

If the selection switch SW2 is in the lower position, the epc600 chip is working within a typical simple range-finder demonstration application. It is in combination with a tiny PIC microprocessor and an easy-to-use 1-button / LED interface.

2.8.1. Microcontroller

The used tiny microcontroller is a 6 pin PIC10F206 from Microchip. It can be programmed by using Microchip's ICD3 In-Circuit Debugger Interface (see chapter 6.1: Related documents).

2.8.2. 1-button / LED interface (S3 / LED9)

The application's human interface is the 1-button / LED interface (refer to Figure 4). With the Teach (S3) pushbutton, the target distance as well as commands are entered to the system. The LED Dist (LED9) is signaling if an object is detected (or the actual status of the system). For a detailed description of the functionality as well the firmware, refer to the "Manual – epc600 Camera".

2.8.3. 2-wire interface connection J11

If the user connects the 2-wire interface to the epc600 chip by his own external controller, the 2-wire interface can be disconnected by the jumpers on the header J11.

2.8.4. Signal connector J12

All signals to and from the microcontroller can be accessed by J12 (see Figure 10) for test purposes.

2.8.5. Test point J15 and J16

Test point J15 and J16 are foreseen to connect ground GND to measurement or test equipment (e.g. to an oscilloscope).

3. Camera module

For the descriptions of the camera modules refer to the documents "Manual – epc600 Camera" or "Manual – epc610 Camera".

4. Setup & installation

For hardware setup and software installation, follow the instructions in the corresponding chapters of the camera manuals.

5. Maintenance and disposal

5.1. Maintenance

The components of the evaluation kit do not need regular maintenance. A functional check is recommended each time the kit is taken into operation:

- Check the mounting position and the detection area of the sensor with respect to the operational conditions. Also check that there is no hazardous situation.
- From time to time, clean the sensor with a soft towel and with a little soapy water to remove dust or dirt.

5.2. Disposal

Disposal should be done using the most up-to-date recycling technologies for electronic components according to the local regulations and laws. The design and manufacture of the kit's components are done in compliance with the RoHS legal regulations. Traces of dangerous materials may be found in the electronic components, but not in harmful quantities.

6. Addendum

6.1. Related documents

- Manual – epc600 Camera, ESPROS photonics corp., 2014
- Manual – epc610 Camera, ESPROS photonics corp., 2014
- epc600 datasheet, ESPROS photonics corp., 2014
- epc610 datasheet, ESPROS photonics corp., 2014
- STM32F205xx, STM32F207xx, STM32F215xx and STM32F217xx advanced ARM-based 32-bit MCUs, Reference manual, ST Microelectronics corp., 2011
- PIC10F200/202/204/206 datasheet, Microchip, 2007

6.2. Links

www.microchip.com
www.microchip.com/icd3
<http://infocenter.arm.com>

