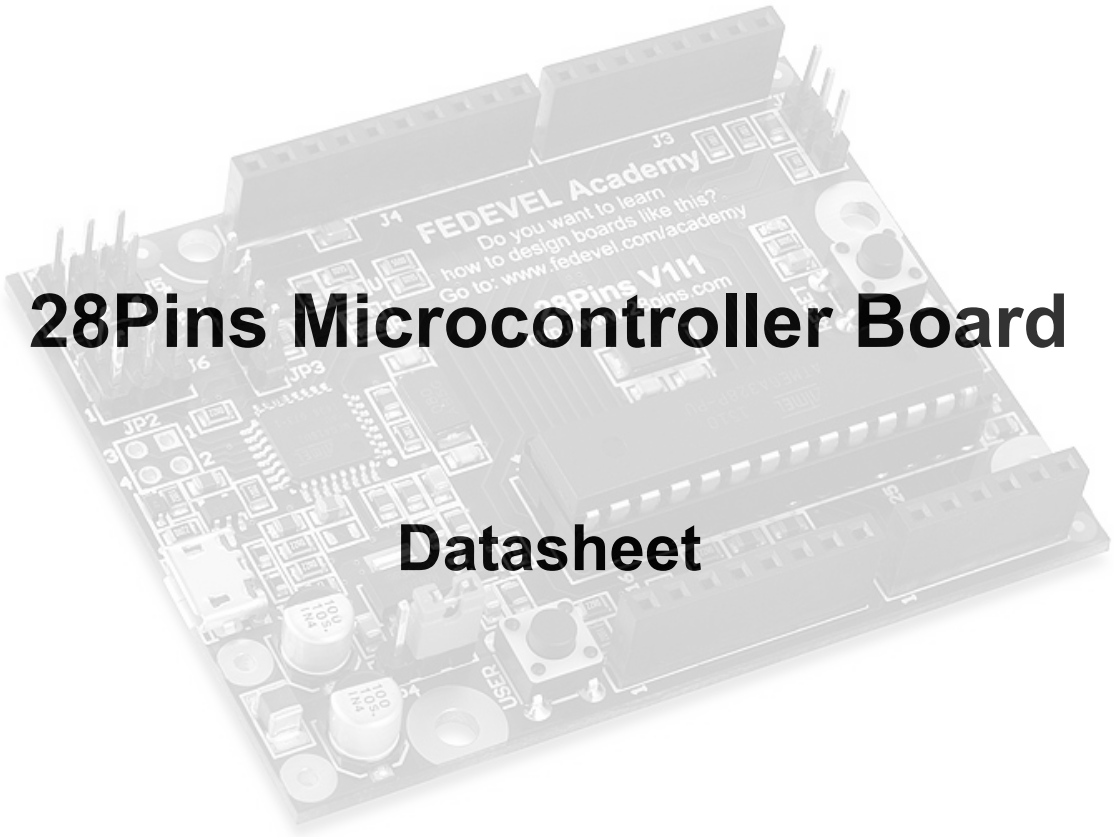
voipac



28Pins Microcontroller Board

Datasheet

Date	Revision	Changes
8. December 2015	1.0	Initial Release

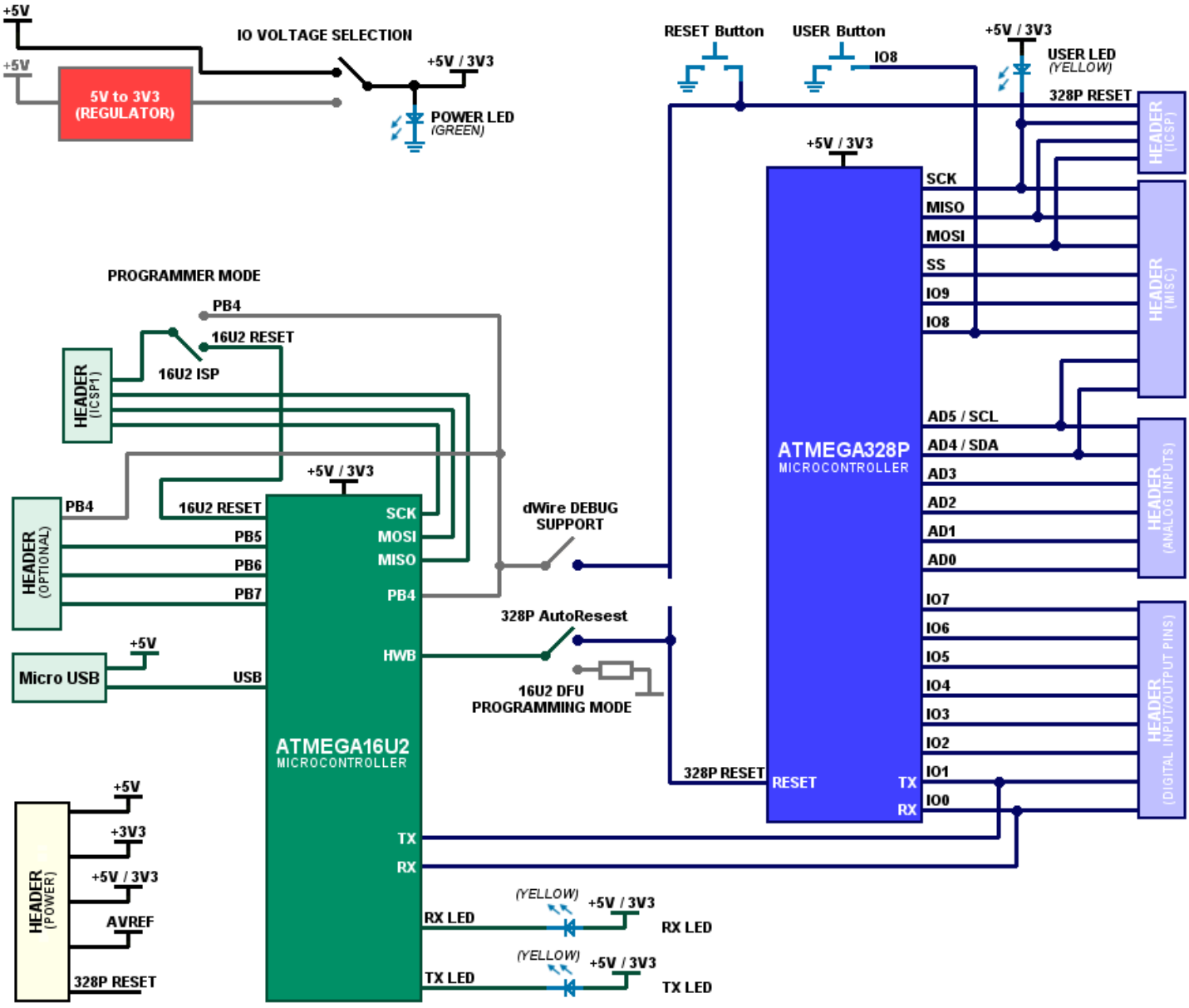
Table of Contents

1. Introduction

1.1 General

This microcontroller board is an amazing tool for hobbyists and robotics fans allowing building devices that can sense inputs from switches or sensors and then control motors, lights or any other output. The 28Pins Microcontroller Board is an open source board based on Arduino project and was developed by FEDEVEL Academy to help people learn how to design their own boards. It is compatible with Arduino UNO Rev. 3 microcontroller board, including couple of useful improvements.

1.2 Hardware - Blockdiagram



1.3 Features

Interface	Description
POWER SUPPLY	9-30V, 15W max+5V or +3V3/+5V IO voltage configuration
POWER INPUT	Micro USB or soldered wires
MICROCONTROLLER	ATMEGA16U2
MICROCONTROLLER	ATMEGA328P
	SPI programming support
	dWire debugging support
LDO REGULATOR	On board +3.3V / 1.5A regulator

1.4 Reference Documents

For more detailed technical information about the 28Pins Microcontroller Board components, please refer to the web resources and documents listed below.

Component	Description
ATMEGA16U2	ATMEGA16U2-AU Datasheet Complete.pdf
ATMEGA328P	ATMEGA328P-PU Datasheet Complete.pdf
TL1963A-33DCQR	http://www.ti.com/lit/ds/symlink/tl1963a-33.pdf

2. Features Description

2.1 Specification

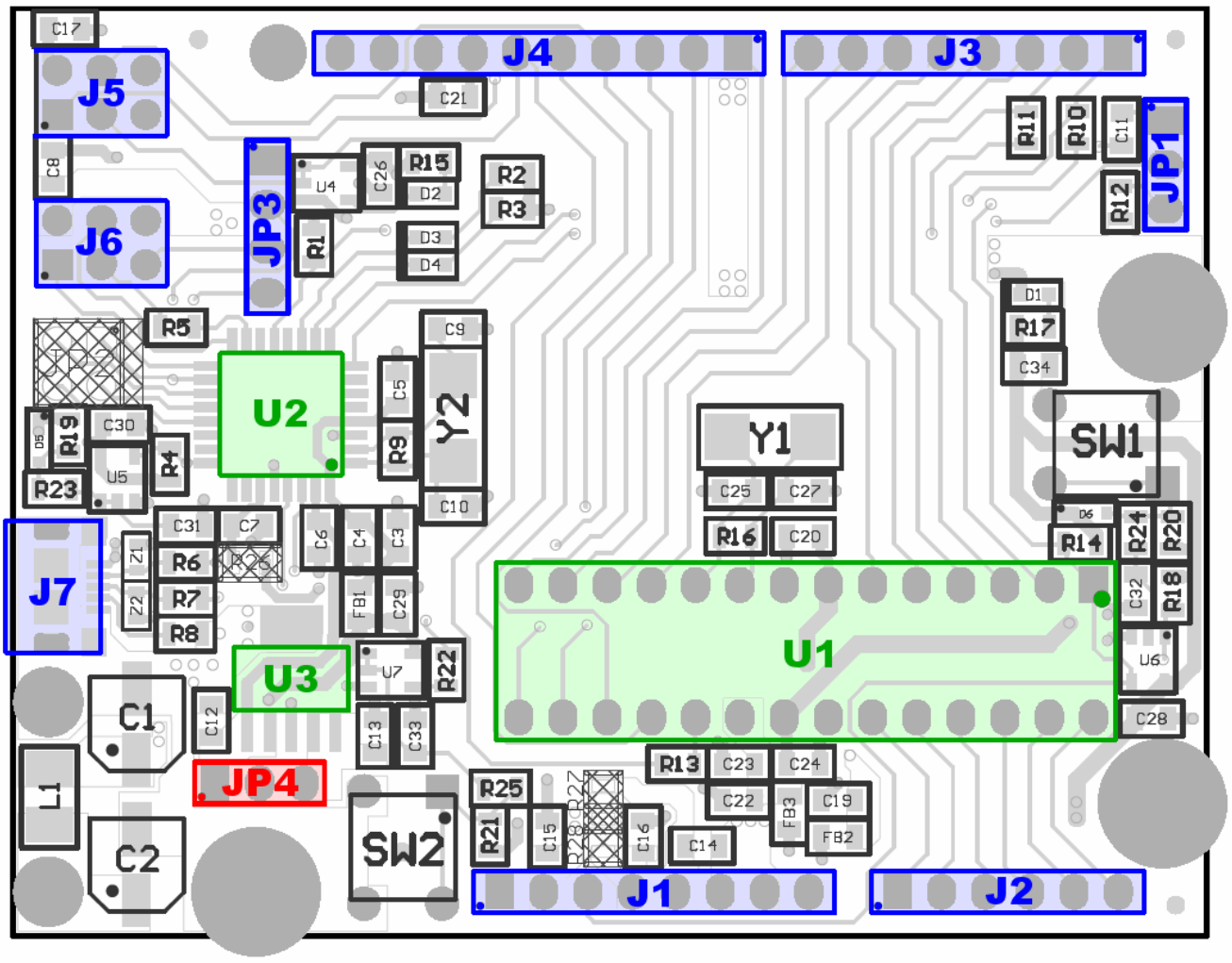
The following user interfaces are available on the 28Pins Microcontroller Board.

ATMEGA328P microcontroller:	ATMEGA16U2 microcontroller:
FLASH: 32kB / EEPROM: 1kB / RAM: 2kB	FLASH: 16kB / EEPROM: 512B / RAM: 512B
Clock: 16MHz (for +5V) / 10MHz (for +3.3V)	Clock: 16MHz (for +5V) / 8MHz (for +3.3V)
20x digital input/output	4x Digital input / output
6x PWM output	2x User LED
6x Analog inputs (10bit AD)	1x USB
1x Serial port, 1x SPI, 1x I2C	1x SPI
1x User LED	1x Serial port (shared with 328P)
1x User Buton, 1x Reset Button	DFU programming support
	AVRISP MKII firmware available

2.2 Board Layout

The top component placement shows interfaces layout of the 28Pins Microcontroller Board. Since not all 28Pins Microcontroller Board interfaces have dedicated pins some functions can not be used simultaneously.

TOP SIDE for 3.3V/5V IO voltage 28Pins Microcontroller Board, P/N: ATM-MCB-335



2.3 Component, Connector and Jumper list

Reference	Type	Description	Page
U1	MICROCONTROLLER	ATMEGA328P-PU	7
U2	MICROCONTROLLER	ATMEGA16U2-AU	8
U3	LDO REGULATOR	TL1963A-33DCQR	9
JP4	POWER SELECTION	1x3 pin, 2,45mm Header	9
JP1		1x3 pin, 2,45mm Header	9
JP2	Not Fitted	2x2 pin, 2,45mm Header	
JP3		1x3 pin, 2,45mm Header	9
J1	POWER	1x8 pin, 2,45mm Female Header	10
J2	AD	1x6 pin, 2,45mm Female Header	10
J3	IOL	1x8 pin, 2,45mm Female Header	10
J4	IOH	1x10 pin, 2,45mm Female Header	11
J5	ICSP	2x3 pin, 2,45mm Header	11
J6	ICSP1	2x3 pin, 2,45mm Header	11
J7	Micro USB	2xUSB-Host stacked	12

(Note) Possible switching between 5V or 3.3V pin voltage by simple changing the JP4 jumper is available at 28Pins 3.3V/5V Microcontroller Board. Ii case of the 28pin 5V Microcontroller Board, JP4 jumper is not fitted.

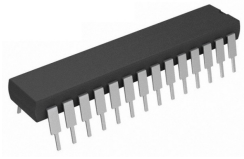
3. Component, Connector and Jumper Description

This chapter describes the components, connectors and jumpers of the 28Pins Microcontroller Board. Connectors have dedicated functionality, however there is possibility to use connector also for other purpose.

3.1 Pinout Description

3.1.1 U1 ATMEGA328P-PU *(28-DIP (0.300", 7.62mm)*

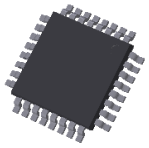
Manufacturer: Atmel Corporation
http://www.atmel.com



Pin#	Function	PINOUT	Description
1	328P_RESETn	PC6 (PCINT14/RESET)	
2	IO0	PD0 (PCINT16/RXD)	
3	IO1	PD1 (PCINT17/TXD)	
4	IO2	PD2 (PCINT18/INT0)	
5	IO3	PD3 (PCINT19/OC2B/INT1)	
6	IO4	PD4 (PCINT20/XCK/T0)	
7	+5V5/3V3_328P_VCC	VCC	
8	GND_1	GND	
9	328P_16MHz_XTAL1	PB6 (PCINT6/XTAL1/TOSC1)	
10	328P_16MHz_XTAL2	PB7 (PCINT7/XTAL2/TOSC2)	
11	IO5	PD5 (PCINT21/OC0B/T1)	
12	IO6	PD6 (PCINT22/OC0A/AIN0)	
13	IO7	PD7 (PCINT23/AIN1)	
14	IO8	PB0 (PCINT0/CLKO/ICP1)	
15	IO9	PB1 (OC1A/PCINT1)	
16	SS	PB2 (SS/OC1B/PCINT2)	
17	MOSI	PB3 (MOSI/OC2A/PCINT3)	
18	MISO	PB4 (MISO/PCINT4)	
19	SCK_R	PB5 (SCK/PCINT5)	
20	+5V5/3V3_328P_AVCC	AVCC	
21	+AREF	AREF	
22	GND_2	GND	
23	AD0	PC0 (ADC0/PCINT8)	
24	AD1	PC1 (ADC1/PCINT9)	
25	AD2	PC2 (ADC2/PCINT10)	
26	AD3	PC3 (ADC3/PCINT11)	
27	AD4/SDA	PC4 (ADC4/SDA/PCINT12)	
28	AD5/SCL	PC5 (ADC5/SCL/PCINT13)	

3.1.2 U1 ATMEGA16U2 (32-TQFP)

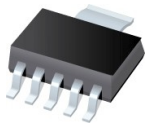
Manufacturer: Atmel Corporation
http://www.atmel.com



Pin#	Function	PINOUT	Description
1	16U2_16MHz_XTAL1	XTAL	
2	16U2_16MHz_XTAL2	XTAL2 (PC0)	
3	GND	GND	
4	+5V/3V3_16U2	VCC	
5	NC	PC2 (PCINT11 / AIN2)	
6	NC	PD0 (OC.0B / INT0)	
7	NC	PD1 (AIN0 / INT1)	
8	16U2_RXD	PD2 (RXD1 / AIN1 / INT2)	
9	16U2_TXD	PD3 (TXD1 / INT3)	
10	16U2_RX_LED	PD4 (INT5/ AIN3)	
11	16U2_TX_LED	PD5 (XCK AIN4 / PCINT12)	
12		PD6 (RTS / AIN5 / INT6)	
13	16U2PROG_328P_RESETn	PD7 (CTS / HWB / AIN6 / T0 / INT7)	
14	NC	PB0 (SS / PCINT0)	
15	16U2_SCLK_R	PB1 (SCLK / PCINT1)	
16	16U2_MOSI	PB2 (PDI / MOSI / PCINT2)	
17	16U2_MISO	PB3 (PDO / MISO / PCINT3)	
18	16U2_PB4	PB4 (T1 / PCINT4)	
19	16U2_PB5	PB5 (PCINT5)	
20	16U2_PB7	PB6 (PCINT6)	
21	16U2_PB8	PB7 (PCINT7 / OC.0A / OC.1C)	
22	NC	PC7 (INT4 / ICP1 / CLKO)	
23	NC	PC6 (OC.1A / PCINT8)	
24	16U2_RESETn	Reset (PC1 / dW)	
25	NC	PC5 (PCINT9/ OC.1B)	
26	NC	PC4 (PCINT10)	
27	+3V3_16U2_UCAP	UCAP	
28	UGND	UGND	
29	USB_P	D+	
30	USB_N	D-	
31	+5V	UVCC	
32	+5V/3V3_16U2	AVCC	

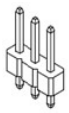
3.1.3 U3 TL1963A-33DCQR (SOT-223-6)

Manufacturer: Texas Instrumets Inc.
http://www.ti.com



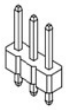
Pin#	Function	PINOUT	Description
1	+5V	SHDN	
2	+5V	IN	
3	GND	GND	
4	+3V3	OUT	
5	+3V3	SENSE / ADJ	
6	GND	GND	

3.1.4 JP4 POWER SELECTION (1x3 pin, 2.54mm Header)



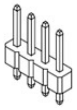
Pin#	Function	Description
1	+5V	
2	+5V/3V3	
3	+3V3	

3.1.5 JP1 (1x3 pin, 2.54mm Header)



Pin#	Pin Name	Description
1	328P_AUTORESETn	
2	16U2PROG_328P_RESETn	
3	GND	

3.1.6 JP3 (1x4 pin, 2.54mm Header)



Pin#	Pin Name	Description
1	328P_RESETn	
2	16U2_PB4	
3	16U2_HDR_RESETn	
4	16U2_RESETn	

3.1.7 J1 POWER (1x8 pin, 2.54mm Female Header)

Pin#	Pin Name	Description
1	NC	
2	+5V/3V3	
3	328P_RESETn	
4	+3V3	
5	+5V	
6	GND	
7	GND	
8	NC	

3.1.8 J2 AD (1x6 pin, 2.54mm Female Header)

Pin#	Pin Name	Description
1	AD0	
2	AD1	
3	AD2	
4	AD3	
5	AD4/SDA	
6	AD5/SCL	

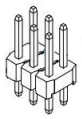
3.1.9 J3 IOL (1x8 pin, 2.54mm Female Header)

Pin#	Pin Name	Description
1	IO0	
2	IO1	
3	IO2	
4	IO3	
5	IO4	
6	IO5	
7	IO6	
8	IO7	

3.1.10 J4 IOH (1x10 pin, 2.54mm Female Header)

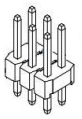
Pin#	Pin Name	Description
1	IO8	
2	IO9	
3	SS	
4	MOSI	
5	MISO	
6	SCK	
7	GND	
8	+AREF	
9	AD4/SDA	
10	AD5/SCL	

3.1.11 J5 ICSP (2x3 pin, 2.54mm Header)



Pin#	Pin Name	Description
1	MISO	
2	+5V/3V3	
3	SCK	
4	MOSI	
5	328P_RESETn	
6	GND	

3.1.12 J6 ICSP1 (2x3 pin, 2.54mm Header)



Pin#	Pin Name	Description
1	16U2_MISO	
2	+5V/3V3	
3	16U2_SCLK	
4	16U2_MOSI	
5	16U2_HDR_RESETn	
6	GND	

3.1.13 J7 MicroUSB (USB MICRO B RECPT SMT R/A)

Manufacturer: FCI Electronics
http://www.fci.com

Pin#	Pin Name	Description
1	+5V_USB	
2	CON_USB_N	
3	CON_USB_P	
4	GND	
5	GND	

4. Technical Specifications

4.1 Input Voltage

Voipac i.MX25 Baseboard on board 5V switching power supply has input voltage ranging from 9V to 30V. Maximum output current of the regulator is 3A thus limiting baseboard, module and all connected peripherals to 15W maximum power consumption.

4.2 Mechanical

Dimmensions	Width	Height	Length	Unit
PCB	53.34 (2100)	1.60 (62.99)	68.58 (2700)	mm (mils)

4.3 Temperature Range

Symbol	Description	Min	Max	Unit
T_AMB	Operating temperature range	-20	85	°C

4.4 RoHS and WEEE Compliance

All of the products designed and manufactured by VOIPAC TECHNOLOGIES are classified as Electrical and Electronic Equipment (EEE) under the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC (RoHS). To comply with the RoHS directive, the restricted use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr 6+), Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDE) must be ensured. VOIPAC TECHNOLOGIES guarantees that its products are assembled in full compliance with the RoHS directive from the European Parliament and Counsel. The company procedures also complies with the Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE) .

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- Any technical or other support provided under warranty by VOIPAC TECHNOLOGIES s.r.o. such as assistance, set-up and installation is provided WITHOUT WARRANTY OF ANY KIND.

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