

Microcontroller Module

XMEGA-A4-USB

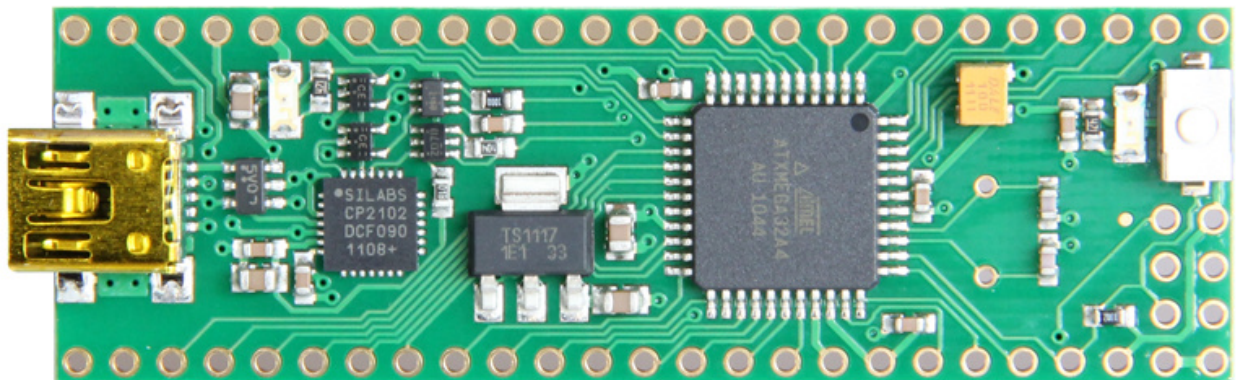


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Module Key Features

Microcontrollermodule with ATxmega32A4-AU AVR microcontroller and Silabs CP2102 USB-UART bridge.

- Microcontroller ATxmega32A4-AU TQFP44 (0-16MHz 1,6...3,6V, 0-32MHz 2,7..3,6V)
- USB-UART-Bridge CP2102 (connected to PORTE USART0 via solder jumper J5/6)
- Power supply configuration
 - External Power Supply connected to +UB Pin, regulated 3,3V VCC with LDO linear voltage regulator or
 - External 1,6..3.6V Power Supply connected to any VCC Pin USB or
 - VBUS voltage 5V, regulated 3,3V VCC with LDO linear voltage regulator
- USB-side ESD-protected (VBUS, D+, D-, Suppressor-Diode-Array)
- USB-Connector Mini-USB SMD
- Leveltranslator between microcontroller PORTE USART0 and USB-USART-Bridge, enables maximum transferrate of CP2102 at VCC range 1,8V to 3,6!
- Reset-Button
- Optional reset via DTR signal of USB-UART bridge (logic level fitted)
- Status-LED (connected via J1 solder jumper to PA7)
- USB VBUS power status LED
- C-L connected to AVCC pin, decoupling capacitors connected to VCC path
- Atmel[®]-pin-compatible PDI programming connector (6-pin, 2-row, soldered)
- All microcontroller IO pins are routed to pinheader connector pads (CON1 and CON2, 2 x 25-pin 1-row, contact spacing 2,54mm, module fits on 2,54mm perfboard)
- Quartz Q1 connected to XTAL1/2 (not soldered)
- Pcb dimensions 63,50mm x 20,3mm
- Pcb technology: FR4, two layers, solder resist, surface NiAu

Optional available:

- Pinheader 2 x 25-pin 1-row, Au, contact spacing 2,54mm
- Receptacle 2 x 25-pin 1-row, Au, contact spacing 2,54mm
- Quartz Q2 connected to XTAL1/2 (Systemclock)

Pin Assignment

Port Pin Assignment

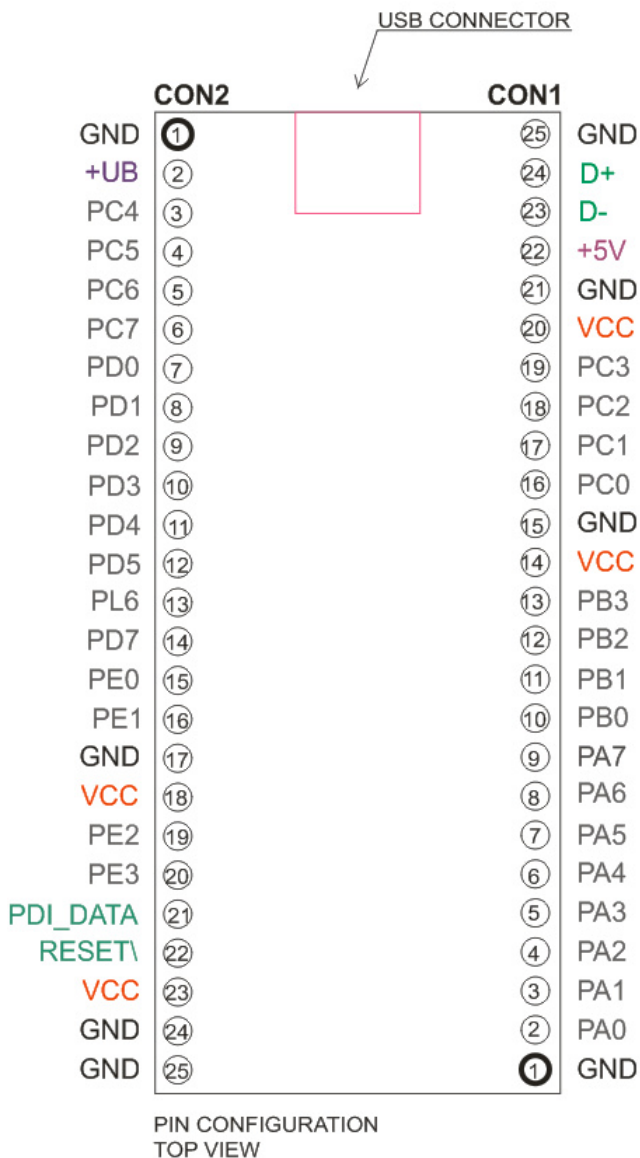
PORT	SIGNAL	ALTERNATE PORT FUNCTION	MODULE CONNECTOR
PORTA	PA0	SYNC ADC0 ADC0 ADC0 AC0 AC0 AREF	CON1-2
	PA1	SYNC ADC1 ADC1 ADC1 AC1 AC1	CON1-3
	PA2	SYNC/ASYNC ADC2 ADC2 ADC2 AC2	CON1-4
	PA3	SYNC ADC3 ADC3 ADC3 AC3 AC3	CON1-5
	PA4	SYNC ADC4 ADC4 ADC4 AC4	CON1-6
	PA5	SYNC ADC5 ADC5 ADC5 AC5 AC5	CON1-7
	PA6	SYNC ADC6 ADC6 ADC6 AC6	CON1-8
	PA7	SYNC ADC7 ADC7 ADC7 AC7 AC0 OUT	CON1-9
PORTB	PB0	SYNC ADC8 AREF	CON1-10
	PB1	SYNC ADC9	CON1-11
	PB2	SYNC/ASYNC ADC10 DAC0	CON1-12
	PB3	SYNC ADC11 DAC1	CON1-13
PORTC	PC0	SYNC OC0A OC0ALS SDA	CON1-16
	PC1	SYNC OC0B OC0AHS XCK0 SCL	CON1-17
	PC2	SYNC/ASYNC OC0C OC0BLS RXD0	CON1-18
	PC3	SYNC OC0D OC0BHS TXD0	CON1-19
	PC4	SYNC OC0CLS OC1A SS\	CON2-3
	PC5	SYNC OC0CHS OC1B XCK1 MOSI	CON2-4
	PC6	SYNC OC0DLS RXD1 MISO	CON2-5
	PC7	SYNC OC0DHS TXD1 SCK CLKOUT EVOUT	CON2-6
PORTD	PD0	SYNC OC0A	CON2-7
	PD1	SYNC OC0B XCK0	CON2-8
	PD2	SYNC/ASYNC OC0C RXD0	CON2-9
	PD3	SYNC OC0D TXD0	CON2-10
	PD4	SYNC OC1A SS\	CON2-11
	PD5	SYNC OC1B XCK1 MOSI	CON2-12
	PD6	SYNC RXD1 MISO	CON2-13
	PD7	SYNC TXD1 SCK CLKOUT EVOUT	CON2-14
PORTE	PE0	SYNC OC0A SDA	CON2-15
	PE1	SYNC OC0B XCK0 SCL	CON2-16
	PE2	SYNC/ASYNC OC0C RXD0	CON2-19
	PE3	SYNC OC0D TXD0	CON2-20

Additional Signals

SIGNAL		MODULE CONNECTOR
RESET\	RESET LOW ACTIVE	CON2-22 CON3-5
PDI_DATA	PDI DATA	CON2-21 CON3-1
D+	USB DP	CON1-24
D-	USB DM	CON1-23

Power Domains

POWER DOMAINS	DESCRIPTION	MODULE CONNECTOR
VCC	TARGET VOLTAGE (ALL VCC PINS ARE CONNECTED)	CON1-14 CON1-20 CON2-18 CON2-23 CON3-2
GND	GROUND (ALL GND PINS ARE CONNECTED)	CON1-1 CON1-15 CON1-21 CON1-25 CON2-1 CON2-17 CON2-24 CON2-25 CON3-6
+UB	EXTERNAL POWER SUPPLY	CON2-2
+5V	USB VBUS +5V (DO NOT APPLY AN EXTERNAL VOTAGE TO THIS PIN! PLEASE NOTE THE MAXIMUM CURRENT CAPABILITY OF USB VBUS!)	CON1-22



Power Supply Configuration

It is possible to choose between following power supply configurations:

- External Power Supply connected to +UB Pin, regulated 3,3V VCC with LDO linear voltage regulator
- External 1,6V to 3,6V Power Supply connected to any VCC Pin USB
- VBUS voltage 5V, regulated 3,3V VCC with LDO linear voltage regulator

POWER SUPPLY CONFIGURATION	JUMPER	JUMPER STATUS
EXTERNAL SUPPLY VOTAGE APPLIED TO +UB PIN	J2	CLOSED
	J3	OPENED
	J4	CLOSED
EXTERNAL SUPPLY VOTAGE APPLIED TO ANY VCC PIN	J2	OPENED
	J3	OPENED
	J4	OPENED
USB VBUS VOLTAGE 5V, REGULATED 3,3V ⁽¹⁾	J2	OPENED
	J3	CLOSED
	J4	CLOSED

(1) USB VBUS voltage 5V is always available at pin CON1-1. If supplying external components with VBUS voltage **PLEASE NOTE THE MAXIMUM CURRENT CAPABILITY OF USB VBUS!**

USB UART Bridge

Due to CP2102 USB UART Bridge, the microcontroller module provides the opportunity to send and receive data via USB, either using the virtual com port VCP or the direkt USB driver DLL USBxpress. To use this feature it is necessary to close two solder jumpers on the pcb.

The UART of CP2102 is connected to PORTE USART0 of ATXmegaA4. The logic levels of the interface signals are fitted due to level translator. The level translator operates down to VCC 1,8V at maximum possible transfer rate of CP2102

USART	CP2102	ATXmegaA4
PORTE	TXD	PE2 (RXD)
	RXD	PE3 (TXD)

Jumper Settings

Close following solder jumpers to use USB USART Bridge connected to PORTE USART0:

POWER SUPPLY CONFIGURATION	JUMPER	JUMPER STATUS
USE USB UART BRIDGE	J5	CLOSED
	J6	CLOSED
USE PORT PIN FUNCTION OF PE2/PE3	J5	OPENED
	J6	OPENED

Reset via DTR Signal

It is possible to reset the microcontroller via DTR Signal

- either by opening the VCP or
- by control the DTR signal manually when using the direct USB driver DLL USBxpress.

To use this feature close following solder jumper:

JUMPER		JUMPER STATUS
J7	USE DTR RESET FEATURE	CLOSED
	DO NOT USE THIS FEATURE	OPENED

On-board LED

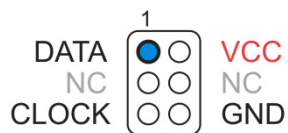
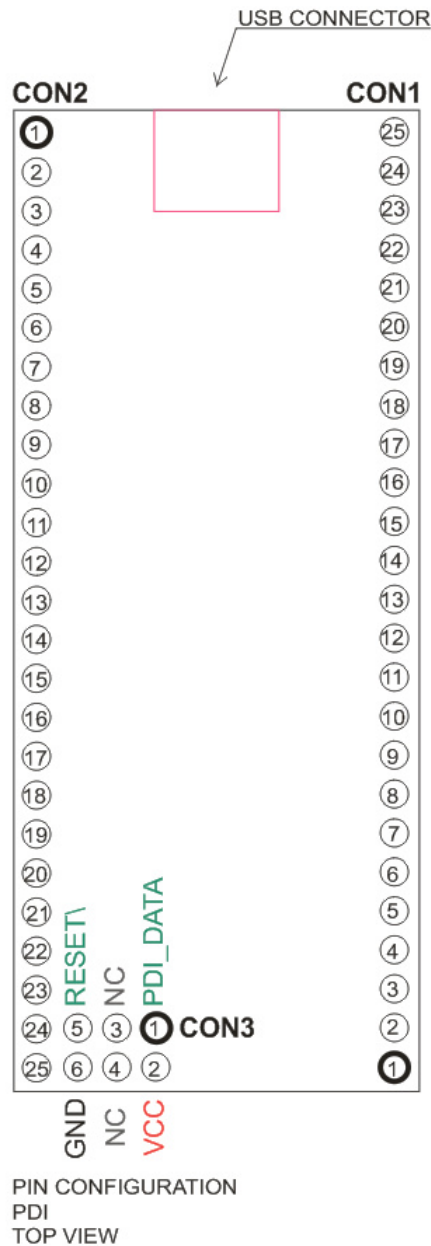
The on-board LED is connected to PA7 of ATxmegaA4 via solder jumper J1. The jumper must be closed to use the LED.

JUMPER		JUMPER STATUS
J1	USE LED	CLOSED
	DO NOT USE LED	OPENED

Program and Debug Interface

PROGRAM AND DEBUG	SIGNAL	PORT PIN ATXMEGAA4	MODULE CONNECTOR
PDI	PDI DATA	PDI_DATA	CON3-1
	VCC	VCC	CON3-2
	NC	-	CON3-3
	NC	-	CON3-4
	PDI CLOCK	RESET\	CON3-5
	GND	GND	CON3-6

PDI Pins also routed to connector CON2.



Pin signal assignment of the PDI connector complies to ATMEL® design recommendations. Directly connect AVRISPmkII®, JTAGICEmkII®, JTAGICE3®, AVR ONE!® and compatible programmers to PDI connector of microcontroller module.

Jumper Configuration Overview

Power Supply Configuration

POWER SUPPLY CONFIGURATION	JUMPER	JUMPER STATUS
EXTERNAL SUPPLY VOTAGE APPLIED TO +UB PIN	J2	CLOSED
	J3	OPENED
	J4	CLOSED
EXTERNAL SUPPLY VOTAGE APPLIED TO ANY VCC PIN	J2	OPENED
	J3	OPENED
	J4	OPENED
USB VBUS VOLTAGE 5V, REGULATED 3,3V ⁽¹⁾	J2	OPENED
	J3	CLOSED
	J4	CLOSED

On Board LED

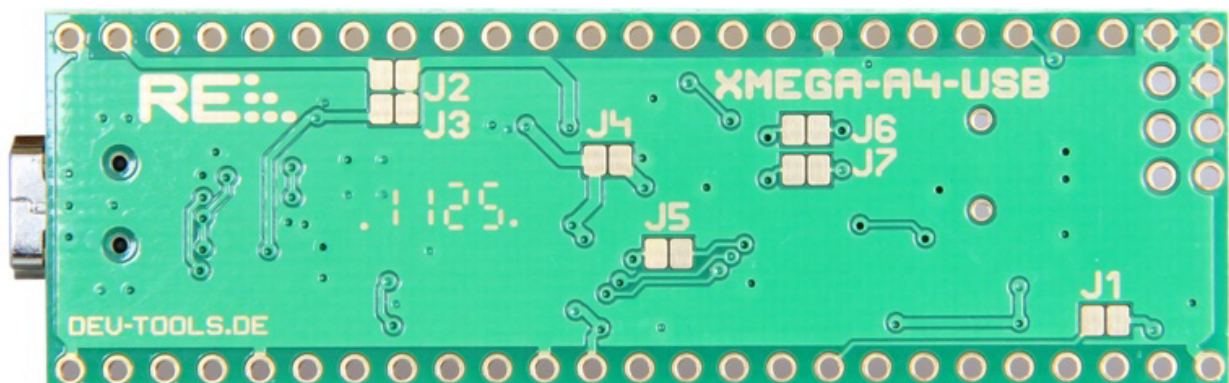
JUMPER		JUMPER STATUS
J1	USE LED	CLOSED
	DO NOT USE LED	OPENED

USB-UART-Bridge

POWER SUPPLY CONFIGURATION	JUMPER	JUMPER STATUS
USE USB UART BRIDGE	J5	CLOSED
	J6	CLOSED
USE PORT PIN FUNCTION OF PE2/PE3	J5	OPENED
	J6	OPENED

Reset via DTR signal

JUMPER		JUMPER STATUS
J7	USE DTR RESET FEATURE	CLOSED
	DO NOT USE THIS FEATURE	OPENED



Charakteristics

Target Voltage and System Clock

ATxmegaA4		Condition	Value			Unit
			min	typ	max	
Target Supply Voltage	VCC	$f_{SYS}=0..16\text{MHz}$	1,6	-	3,6	V
		$f_{SYS}=0..32\text{MHz}$	2,7	-	3,6	V
System Clock	f_{SYS}		-	-	32	MHz

Power Supply Voltages

	Pin	Condition	Value			Unit
			min	typ	max	
External Supply Voltage applied to any VCC Pin	VCC	Jumper opened: J2, J3, J4	1,6	3,3	3,6	V
External Supply Voltage applied to Pin +UB	+UB ⁽¹⁾	$I_{MAX} = 0,5\text{A}$ VCC reg. 3,3V No voltage applied to Pin +5V. Jumper closed: J2, J4 Jumper opened: J3	4,5	-	7,5	V

(1) If an external power supply voltage is applied to +UB pin, the LDO linear regulator TS1117CW-3,3 is used to regulate the 3,3V VCC target voltage. The maximum dropout voltage of the regulator amounts 1,5V (typ. 1,3V) at 1,0A. The operating junction temperature is 0°C to 125°C. Please note the maximum operating values of the regulator (see datasheet) if using higher currents and higher +UB voltages than specified in table above.

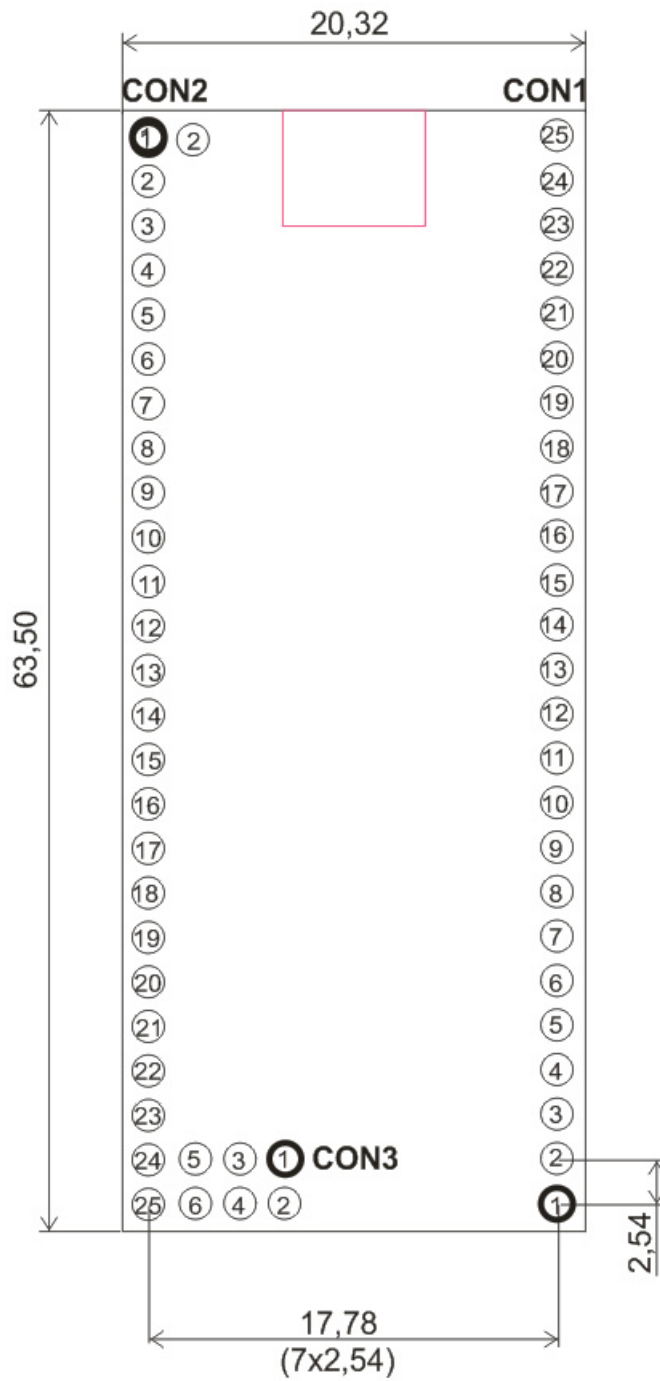
USB-UART-Bridge Leveltranslator and Baudrate

		Note	Value			Unit
			min	typ	max	
Translated voltage range	VCC		1,8	-	3,6	V
Transferrate	TR	See also Silabs Application Note AN205 for Baudrates	-	-	921600	bps

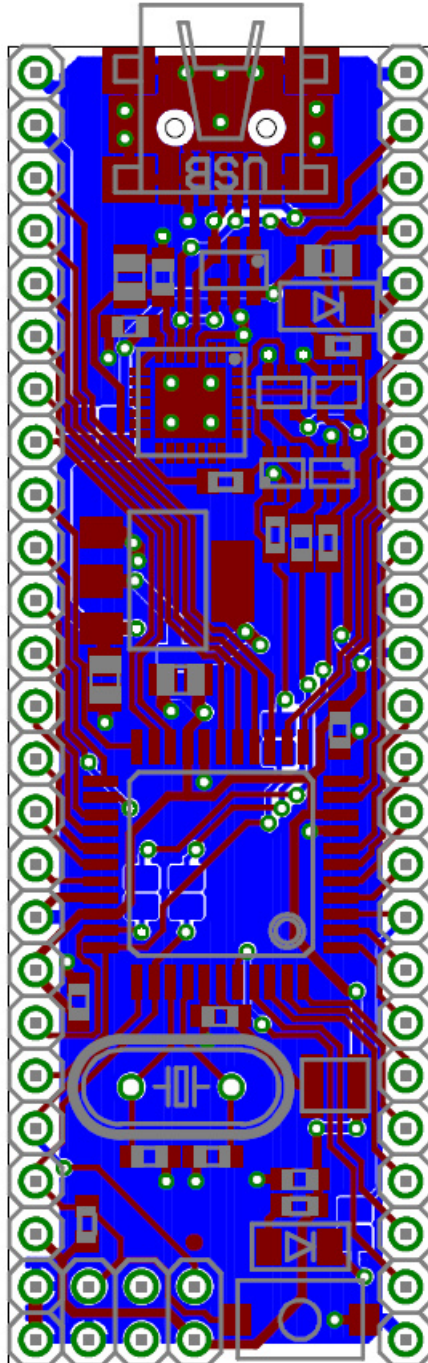
ATxmega32A4 Features

ATxmega32A4	
Flash (Kbytes):	32
SRAM (Kbytes):	4
EEPROM (Bytes):	1024
Pin Count	44
Max. Operating Frequency	32MHz
Max I/O Pins	34
Ext Interrupts	34
SPI	7
TWI	2
UART	5
ADC channels	12
ADC resolution	12 bit
ADC speed	2MHz
Analog Comparators	2
DAC channels	2
DAC channels	2
DAC resolution	12 bit
Timers	5
Output Compare channels	16
PWM Channels	16
32kHz RTC	yes
Temp. Sensor	yes
Self Program Memory	yes
picoPower	yes
Crypto Engine	AES/DES
QTouch Channels	16
Calibrated RC Oscillator	yes
I/O Supply Class	1.6V to 3.6V

Dimensions and Layout



DIMENSIONS IN MM
TOP VIEW





Intended use	This product is intended to use as development and evaluation board for developing microcontroller based applications.
Warning	To avoid damage due to electrostatic discharge (ESD), appropriate measures for ESD protection are to be taken for handling and only appropriately trained personnel should handle the board.
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