All-in-one Starter Kit for Arduino

DataSheet

V1.0

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1 Product Information

1.1 Introduction

The All-in-One Starter Kit for Arduino is an entry-level kit specifically designed for beginners, featuring 21 progressive tutorials that combine entertainment with enlightenment. These tutorials cover comprehensive content including sensor applications and logical thinking cultivation, systematically guiding users to master various sensor operations while effectively enhancing programming logic development capabilities. Through structured learning, users will rapidly acquire Arduino programming skills and practical implementation expertise.

This kit includes 15 electronic sensors (14 onboard sensors and 1 Crowtail-interface Moisture Sensor), each demonstrating unique functionalities and characteristics. The learning process not only strengthens logical thinking skills but also elevates creative conceptualization abilities. Engineered to accommodate diverse educational and application scenarios, it serves as an ideal solution for students, educators, and hardware enthusiasts to explore electronics prototyping and computational thinking development.

1.2 Features

- **Integrated 15-in-1 Multi-functional Sensors:** Combines 15 sensors with distinct functionalities into a unified system.
- **Plug-and-Play Design:** No soldering required; ready for immediate use with direct plug-and-wire connectivity.
- **21 Creative Project Tutorials:** Step-by-step guides to inspire innovation and learning.
- **Portable Carrying Case:** Compact and refined packaging with a sleek, lightweight design for easy transport.
- **Expandable Connectivity:**
  - 6 reserved Crowtail interfaces(3× I/O, 2× I2C, 1× UART).
  - Fully compatible with Crowtail sensors (sold separately), enabling flexible customization and expansion.

2 Product Appearance Diagram

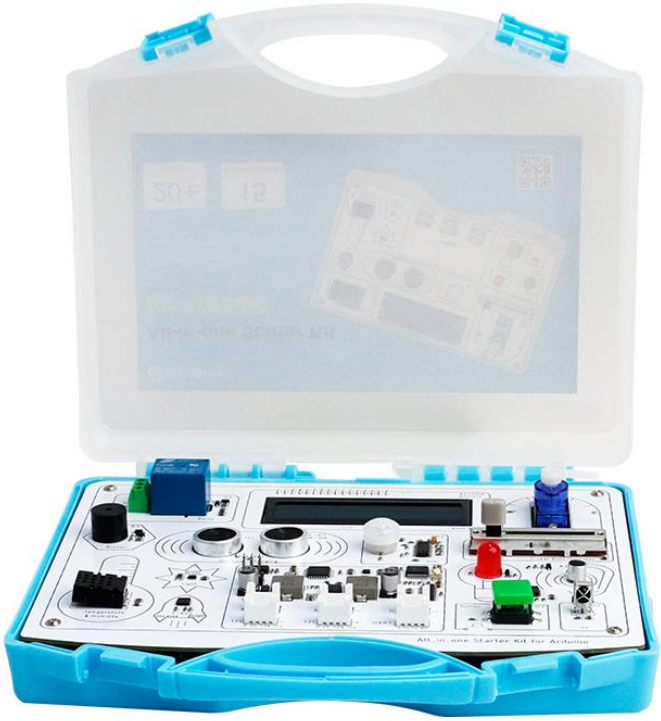


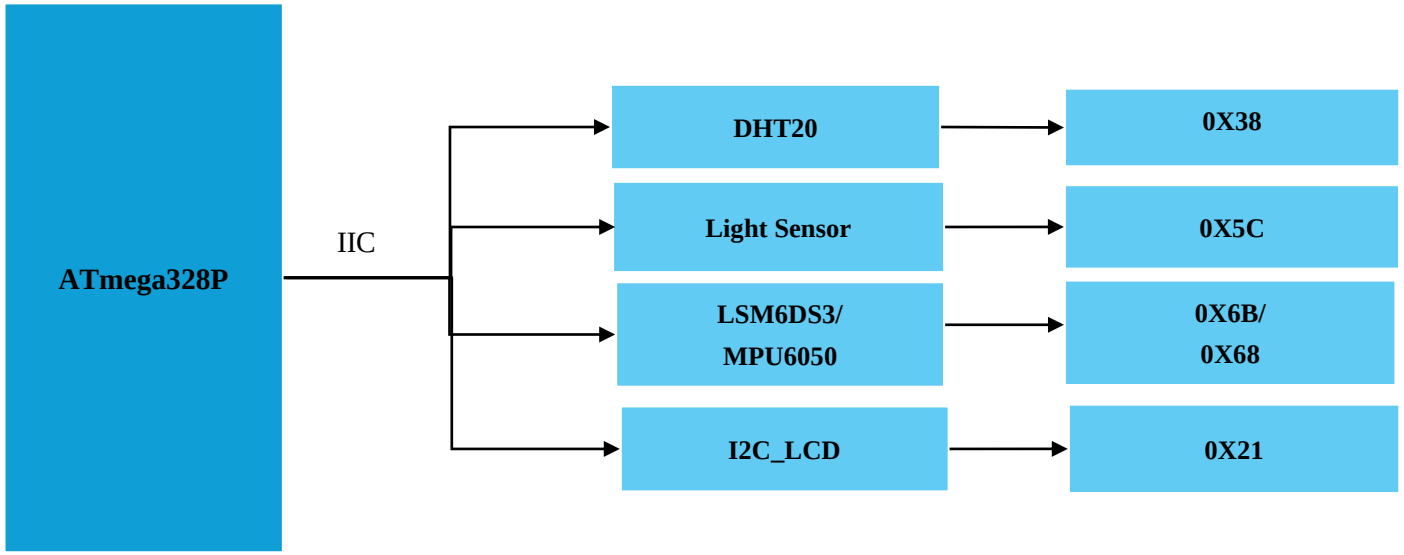
Figure 1:Front View

Figure 2:Side View

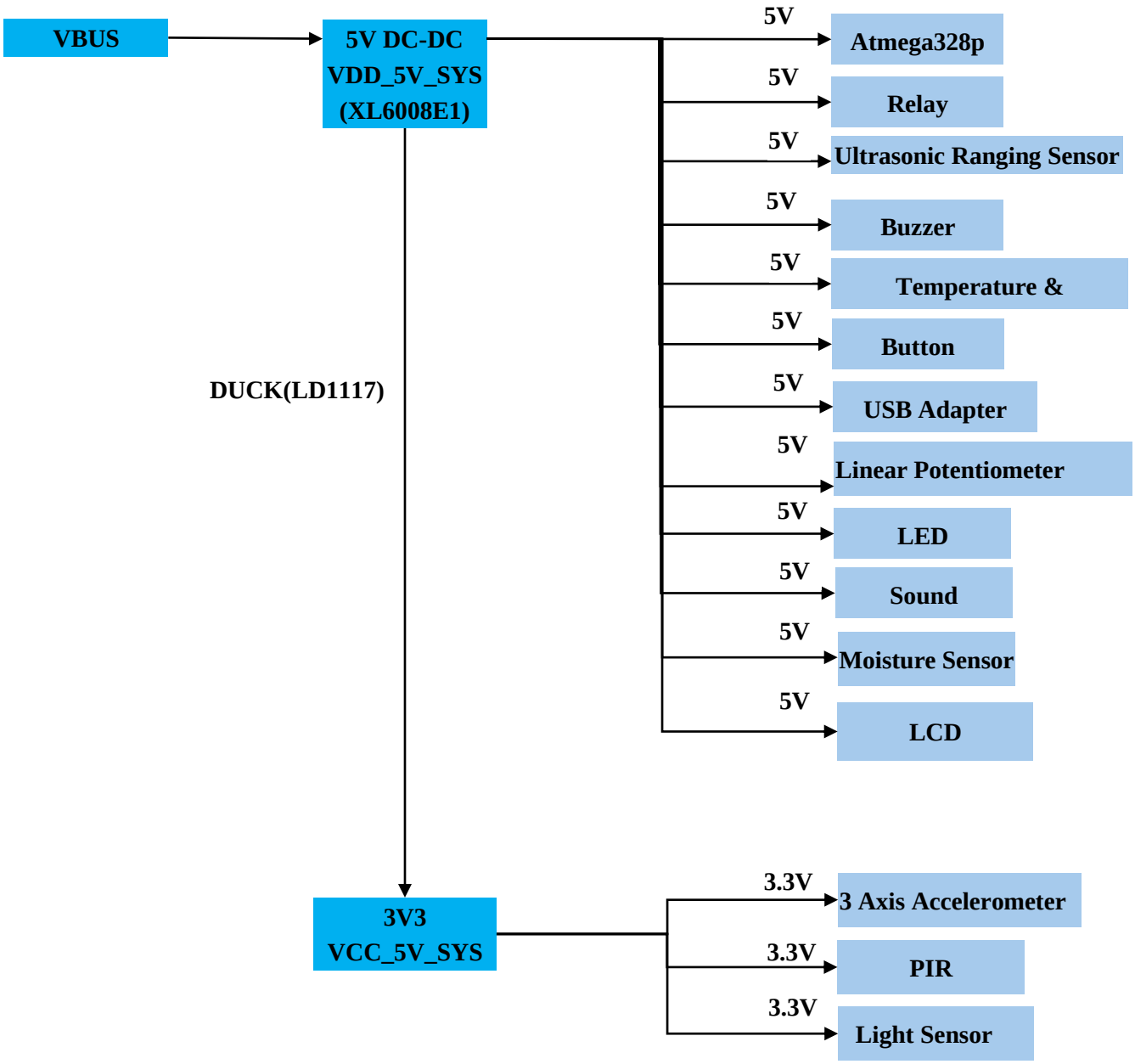
3 Product Dimensions

Figure 3:Product Dimensions Drawing

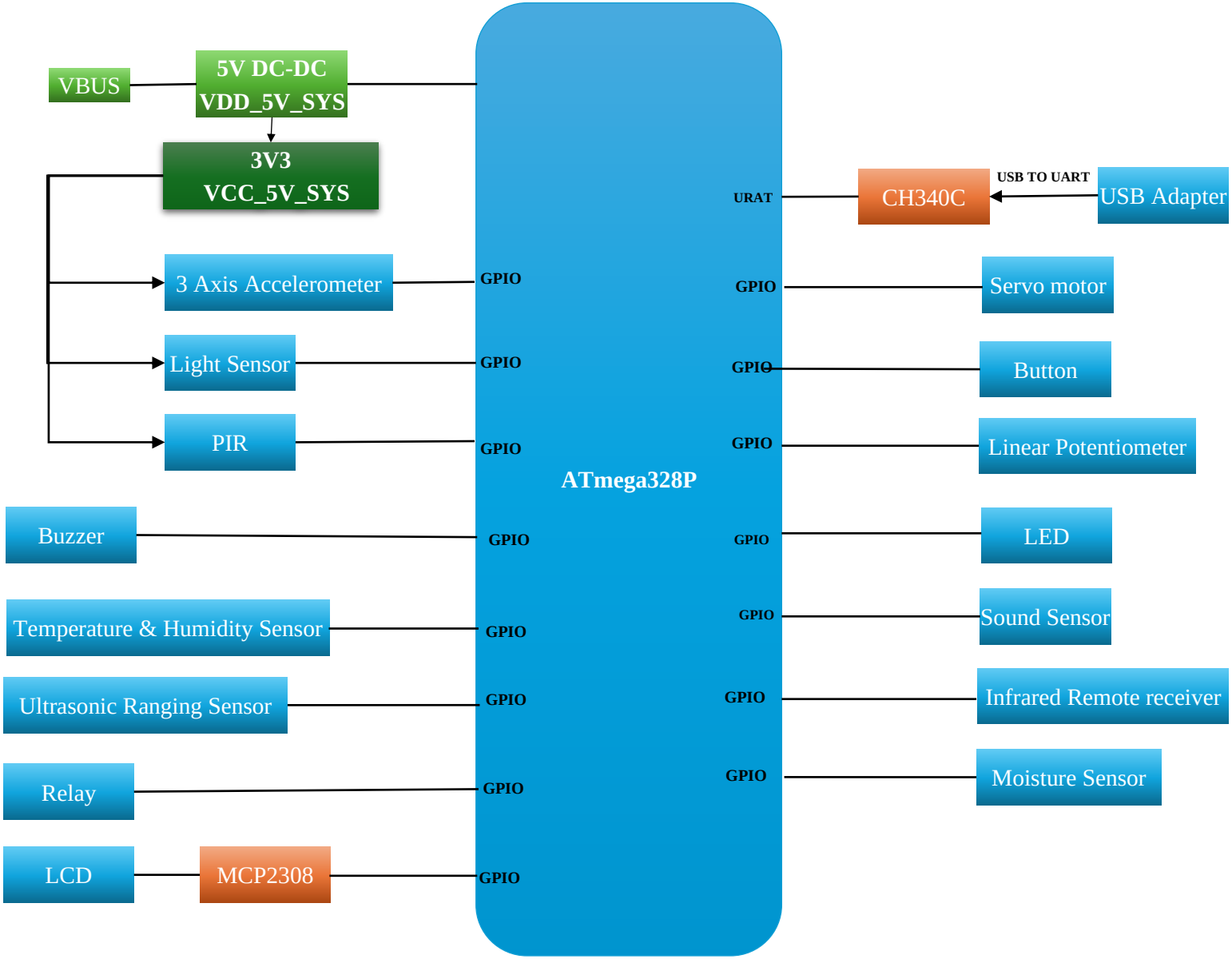
4 I2C Sensor Diagram



5 Power Supply Diagram



6 System Block Diagram



7 Hardware Overview

Figure 4:Motherboard sensor Function Diagram

7.1 Sensor Functions

The All-in-one Starter Kit for Arduino is equipped with a total of 15 common sensors. For the specific sensor names, connection pins, and sensor functions, please refer to the following table:

No.	Sensor Name	MCU Pins	Brief Function Description
1	Temperature & Humidity Sensor	PC4(ADC4/SDA) PC5(ADC5/SCL)	Used for detecting temperature and humidity changes.
2	Button	PD7(AIN1)	Detects whether the button is pressed, which can be used for human-computer interaction.
3	Ultrasonic Ranging Sensor	PD5(T1) PD6(AIN0)	Can be used for distance measurement.
4	Light Sensor	PC4(ADC4/SDA) PC5(ADC5/SCL)	Used for detecting light intensity.
5	Linear Potentiometer	PC0(ADC0)	Used for simulating voltage changes.
6	LED	PB2(SS/OC1B)	Red indicator light.
7	Buzzer	PD3(INT1)	By outputting PWM to control the frequency of the buzzer to produce different sounds.
8	LCD1602 Display	PC4(ADC4/SDA) PC5(ADC5/SCL)	LCD1602 blue - backlit display.
9	Infrared Remote	PD2(INT0)	Receive infrared remote control signals and output electrical signals.
10	Relay	PD4(XCK/T0)	Used to control the switching of other external circuits.
11	Servo motor	PB1(OC1A)	By inputting control signals, the shaft can rotate precisely to the specified angle.
12	Sound Sensor	PC1(ADC1)	Can be used to detect ambient sound.
13	3 Axis Accelerometer& Gyro 2.0	PC4(ADC4/SDA) PC5(ADC5/SCL)	Detect the angular velocity and acceleration of objects.
14	PIR	PC2(ADC2)	Used to detect whether there is human body movement.
15	Moisture Sensor	PC3(ADC3) ADC6	Used for detecting soil moisture.

7.2 Main Controller Pins

No.	Pin Type	Pin Number	MCU Pin	Pin Application
1	Power Pins	6	VCC_5V	Provides 5V power for the microcontroller
2		4	VCC	Provides 5V power
3		5	GND	Ground
4		3	GND	Ground
5		21	GND	Ground
6		18	AVCC	Analog power
7		20	AREF	Analog reference voltage
8	Reset Pin	29	RESET	Reset pin
9	Clock Pins	7	PB6 （XTAL1/TOSC1）	Connect a 16MHz crystal oscillator to provide the clock signal for the microcontroller.
10		8	PB7 （XTAL2/TOSC2）	
11	I/O Pins	30	PD0 (RXD)	Serial data receive
12		31	PD1 (TXD)	Serial data transmit
13		32	PD2 (INT0)	Infrared sensor input
14		1	PD3 (INT1)	Buzzer output
15		2	PD4 (XCK/T0)	Relay output
16		9	PD5 (T1)	Ultrasonic sensor echo input
17		10	PD6 (AIN0)	Ultrasonic sensor trigger output
18		11	PD7 (AIN1)	Button input
19		23	PC0 (ADC0)	Linear potentiometer input
20		24	PC1 (ADC1)	Sound sensor input
21		25	PC2 (ADC2)	PIR sensor input
22		26	PC3 (ADC3)	A Sensor3
23		27	PC4 (ADC4/SDA)	I2C Data Line
24		28	PC5 (ADC5/SCL)	I2C Clock Line
25		19	ADC6	A Sensor6

26		22	ADC7	Reserved
27		12	PB0 (ICP)	Reserved
28		13	PB1 (OC1A)	Servo Control Output
29		14	PB2 (SS/OC1B)	LED Output
30		15	PB3 (MOSI/OC2)	D Sensor11
31		16	PB4 (MISO)	SPI MISO
32		17	PB5 (SCK)	SPI Clock

7.3 LED Indicators

No.	Name	Silkscreen	Pin	MCU Pin	Color	Function Description
1	Power Indicator LED	PWR	VCC_5V	D10_LED	Red	The red LED indicator lights up when powered on and turns off when power is cut.
2	LED	/	D0/RX	PD0(RXD)	Blue	Flashes when UART reads data
3	LED	/	D1/TX	PD1(TXD)	Blue	Flashes when UART writes data

7.4 USB Adapter

No.	Name	Chip	MCU Pin	Function Description
1	USB_DN USB_DP	CH340C	PD0(RXD) PD1(TXD)	USB-to-UART for connecting and communicating with external serial devices.

7.5 Buttons

No.	Name	Silkscreen	Pin	MCU Pin	Function Description
1	RESET	Reset	RESET	PC6(/RESET)	Press the button to reset the main controller.
2	Button	Button	D7_BUTTON	PD7(AIN1)	Customizable button.

7.6 6 Crowtail Interfaces

No.	Name	Silkscreen	Pin	MCU Pin	Voltage Domain	Per I/O Pin	Function
1	A Interface	G 5V / A3	A3	PC3(ADC3)	5V	DC 20mA	Analog GPIO
2	A Interface	G 5V / A6	A6	ADC6	5V	DC 20mA	Analog GPIO
3	D Interface	G 5V / D11	D11	PB3(MOSI/OC2)	5V	DC 20mA	Digital GPIO
4	I2C	G 5V SDA SCL	A4/SDA A5/SCL	PC4(ADC4/SDA) PC5(ADC5/SCL)	5V	DC 20mA	I2C Interface
5	I2C	G 5V SDA SCL	A4/SDA A5/SCL	PC4(ADC4/SDA) PC5(ADC5/SCL)	5V	DC 20mA	I2C Interface
6	UART	G 5V TX RX	D0/RX D1/TX	PD0(RXD) PD1(TXD)	5V	DC 20mA	UART Interface

8 Technical Specifications

No.	Item		Specification
1	CPU/Soc	Processor IC	ATmega328P
2		RAM	2KBytes
3		Flash	32KBytes
4		EEPROM	1KBytes
5	Development Environment	Programming Language	C/C++
6	Voltage	Operating Voltage	5 V
7		Input Voltage (Recommended)	DC 5V-20V
8	Mechanical Characteristics	Dimensions	195*170*46（mm）
9		Material	PP
10		Weight	380g
11	LCD 1602	Display Area	64.5*14.0（mm）
12		Operating Voltage	5V
13		Operating current (excluding backlight)	1.7mA(MAX)
14		Operating current (backlight)	24mA(MAX)
15	Internal functions	Reset button	RESET
16			Button
17		Indicator lights	Power indicator light
18			URAT indicator light
19	External interfaces	6 Crowtail interfaces	➢ 3× I/O ➢ 2× I2C ➢ 1× UART
20		USB connector	Type-C port

9 Electrical Parameters

9.1 Power Consumption Parameters

No.	Item	Voltage	Current	Power Consumption
1	Power consumption after the minimum system is started	5V	42mA	0.21W
2	Maximum power consumption with all functions enabled	5V	138mA	0.69W

10 Environmental Parameters

10.1 Normal Operating Conditions

No.	Item	Specification
1	Input Voltage	DC 5V~20V
2	Storage Temperature	-40°C to +85°C

10.2 Extreme Conditions

No.	Item	Specification
1	Input Voltage	DC 3.6V~32V
2	Operating Temperature	-55°C to +125°C
3	Storage Temperature	-65°C to +150°C

11 Related Documents and Resources

- All-in-one Starter Kit for Arduino Product Link

12 Revision History

Date	Version	Release Notes
2025/4/17	V1.0	Initial Release