

## INTRODUCTION

DFR1071-GP8211S (1-Channel 15-bit I2C to 0-5V/10V DAC Module)

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# SKU:DFR1071 (<https://www.dfrobot.com/product-2757.html>)

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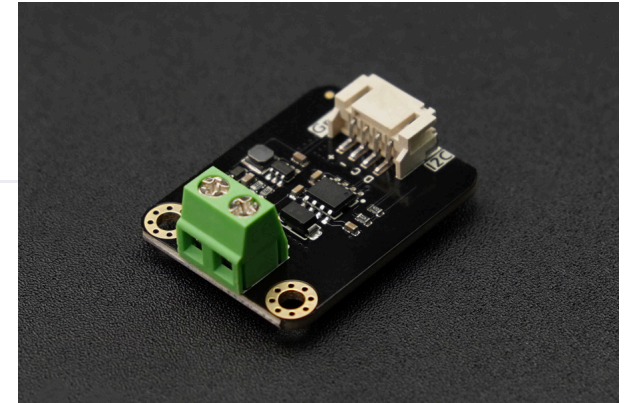
## INTRODUCTION

DAC series modules are a range of products that can be controlled through I2C or PWM signals to generate voltage or current output signals. They possess the capability to produce a variety of analog voltage or current signals, including 0-5V, 0-10V, 0-2.5V, 0-VCC, and 0-25mA.

An analog quantity refers to the continuous variation of voltage magnitude (or current magnitude) within a specific range. Due to its stability, long transmission distance, and ease of use, it has found widespread application in the field of industrial automation control, including:

- Motor speed control
- Sound intensity control
- Temperature regulation
- Adjustment of light brightness
- Valve angle modulation

etc.



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This series of DAC products not only offers a variety of output signal ranges, but also provides three selectable resolutions: 8-bit, 12-bit, and 15-bit. It allows for the choice of either single-channel or dual-channel configurations, and multiple modules can be cascaded to form a multi-channel output. When coupled with Arduino controllers, Raspberry Pi, STM32, and similar controllers, it finds application in various automation control scenarios, including:

- Laboratory testing equipment
- Automatic motor speed control
- Indoor and outdoor lighting control
- Automated volume adjustment
- Backlight control for displays
- etc.

The following table presents the functional parameters of each DAC product for reference in the selection process.

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## 0-2.5V/VCC Product

SKU	Name	Chip module	Functional Diagram	Number of Channels	Output	Input	Resolution	Linearity error	Product Features
DFR1034	2-channel I2C to 0-2.5V/0-VCC	GP8503		2	0-2.5V/VCC	I2C	12bit	0.10%	2 channels, expandable up to 8 modules through cascading.
DFR1037	2-channel PWM to 0-2.5V/0-VCC	GP8501		2	0-2.5V/VCC	PWM	8bit	0.10%	2 channels, PWM input, versatile compatibility.
DFR1035	1-channel I2C to 0-2.5V/0-VCC	GP8512		1	0-2.5V/VCC	I2C	15bit	0.01%	High resolution and precision.

## 0-5V/10V Product

SKU	Name	Chip module	Functional Diagram	Number of Channels	Output	Input	Resolution	Linearity error	Product Features
DFR0971	2-channel I2C to 0-5V/0-10V	GP8403		2	0-5V/10V	I2C	12bit	0.10%	2 channels, expandable up to 8 modules through cascading.
DFR1073	2-channel 15bit I2C to 0-5V/0-10V	GP8413		2	0-5V/10V	I2C	15bit	0.01%	2 channels, offering high resolution and precision, expandable up to 8 modules through cascading.
DFR1071	1-channel 15bit I2C to 0-5V/0-10V	GP8211S		1	0-5V/10V	I2C	15bit	0.01%	High resolution and precision.
DFR1036	1-channel PWM to 0-5V/0-10V	GP8101S		1	0-5V/10V	PWM	8bit	0.10%	PWM input, versatile compatibility.

## 4-20mA Product

SKU	Name	Chip module	Functional Diagram	Number of Channels	Output	Input	Resolution	Linearity error	Product Features
DFR0972	1-channel I2C to 4-20mA	GP8302		1	0-20mA	I2C	12bit	0.10%	More stable current signal.

# DFR1071-GP8211S (1-Channel 15-bit I2C to 0-5V/10V DAC Module)

## FUNCTIONS

This is a 1-channel DAC module with I2C communication, a resolution of 15-bit, and 0.01% output voltage linearity error, capable of generating analog voltage outputs of 0-10V or 0-5V. The 0-10V or 0-5V voltage output is a standard driving method. It can be widely used in automation control scenarios such as lighting adjustment, frequency converters, valve regulation, and pump control, etc. This product can drive a variety of 0-10V or 0-5V controlled devices available in the market through Arduino programming.

The high precision and resolution of this module make it suitable for control scenarios that require higher signal accuracy, such as fine speed control or angle control.

## FEATURES

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- Support 3.3V-5V power supply.
- Output voltage linearity error of 0.01%.
- Two channels of voltage output, either 0-5V or 0-10V, enabling connection and control of standard analog voltage devices.
- Gravity interface, I2C communication, Arduino control, suitable for program automation control.
- The high precision and resolution of this module make it suitable for control scenarios that require higher signal accuracy.



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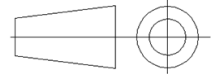
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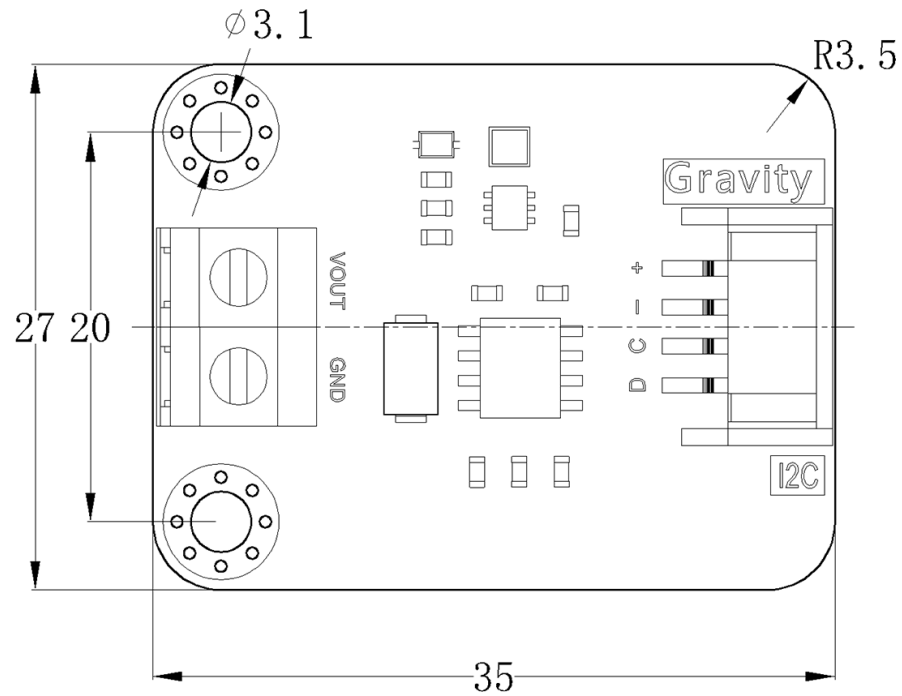
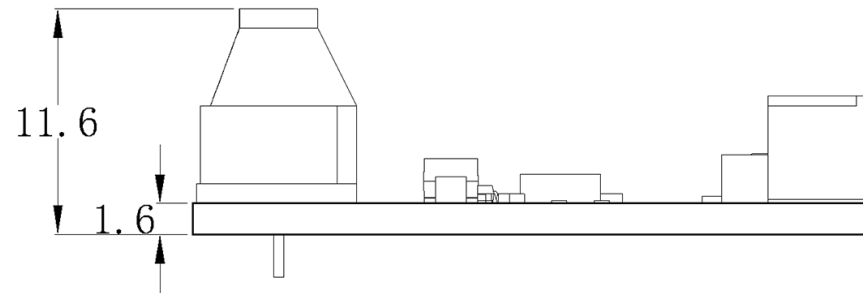
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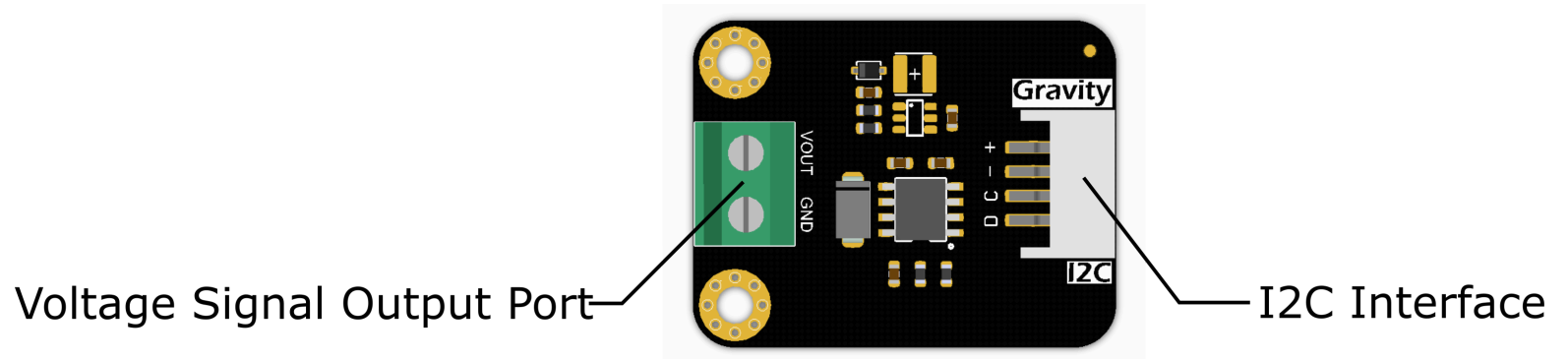
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Name	Description	Remarks
I2C Interface	+	Positive terminal of the power supply (3.3V-5V)
	-	Negative terminal of the power supply
	C	SCL
	D	SDA
Voltage Signal Output Port	VOUT	Positive terminal of output voltage signal
	GND	Negative terminal of the output voltage signal

## SPECIFICATIONS

- Chip Type: GP8211S
- Operating Voltage: 3.3V-5V
- Output Voltage: 0-5V or 0-10V

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- Number of Channels: 1 channel
- Communication Method: I2C
- Resolution: 15-bit
- Value Range: 0 - 32767 corresponding to 0-5V or 0-10V
- Output voltage linearity error: 0.01%

## TUTORIAL

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In this example, we will demonstrate the correlation between the input signal values and the corresponding voltage output in the channels.

Input signal value range: 0-32767

Input value of 21457, resulting in an output voltage of 6.548V

## SOFTWARE REQUIREMENTS

- Download Arduino IDE: Click to download Arduino IDE (<https://www.arduino.cc/en/Main/Software>)
- Download Arduino libraries: Click to download [https://github.com/DFRobot/DFRobot\\_GP8XXX](https://github.com/DFRobot/DFRobot_GP8XXX) ([https://github.com/DFRobot/DFRobot\\_GP8XXX](https://github.com/DFRobot/DFRobot_GP8XXX))

Click the link to view: How to install the library?; (<http://www.dfrobot.com.cn/community/forum.php?mod=viewthread&tid=1854&page=1&extra=#pid6955>)

**Note: All modules in this series utilize the same library.**

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# HARDWARE CONNECTION

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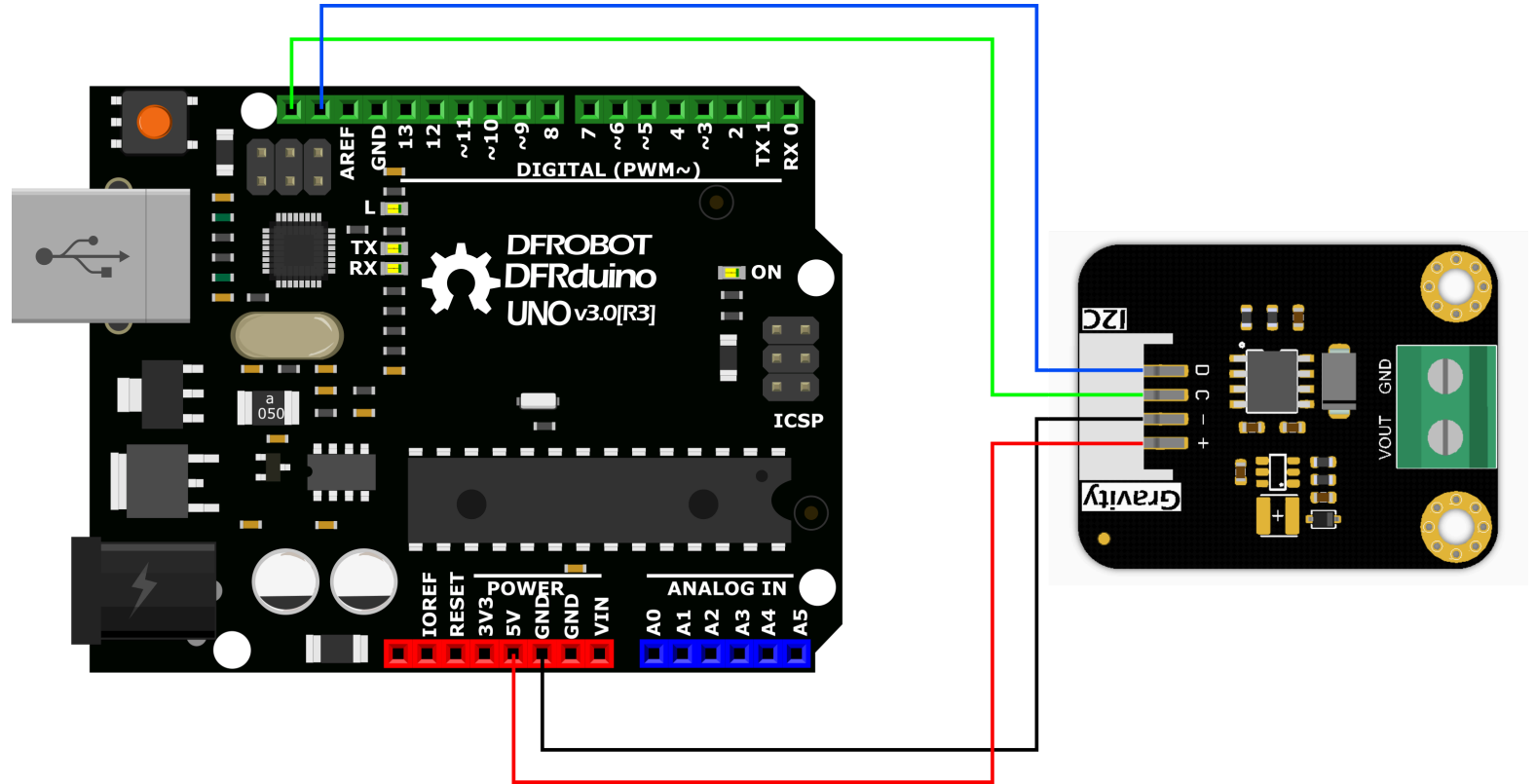
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## SAMPLE CODE

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```
#include <DFRobot_GP8XXX.h>

DFRobot_GP8211S GP8211S;

void setup() {

    Serial.begin(9600);

    while(GP8211S.begin()!=0){
        Serial.println("Communication with the device has encountered a failure. Please verify th
        delay(1000);
    }
    GP8211S.setDACOutRange(GP8211S.eOutputRange10V);
    /**
     * @brief. Configuring different channel outputs for DAC values
     * @param data. Data values corresponding to voltage values
     * @n (0 - 32767) .This module is a 15-bit precision DAC module, hence the values ranging f
     */
    GP8211S.setDACOutVoltage(21456);//Output 6.548V

    delay(1000);

    //The set voltage is saved internally in the chip for power-off retention.
    //GP8211S.store();
}

void loop() {

}
```

## RESULT

After downloading the program, the actual output voltage of channel was measured as 6.548V using a voltmeter.

## More Documents

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### DFR1071 Documents:

DFR1071-Schematics.pdf

(<https://dfimg.dfrobot.com/60c1e008bddfc41c3293de80/wiki/1dbe79b2c87c30b58364d5ca09e999a1.pdf>)

DFR1071\_Dimensions.pdf

(<https://dfimg.dfrobot.com/60c1e008bddfc41c3293de80/wiki/a50bfbaa1119d9c3bc871747cb10c0ba.pdf>)

DFR1071\_3D File.rar

(<https://dfimg.dfrobot.com/60c1e008bddfc41c3293de80/wiki/af6b9b8d1cbb3e304a22bf15ecc2119b.rar>)

DFR1071\_2D\_CAD File.rar

(<https://dfimg.dfrobot.com/60c1e008bddfc41c3293de80/wiki/df2c63288486fb2b6cf16afe54f28774.rar>)

DFR1071\_GP8211 Datasheet.pdf

(<https://dfimg.dfrobot.com/60c1e008bddfc41c3293de80/wiki/ba0965797797fb7d66e3ab0256100fac.pdf>)

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For any questions, advice or cool ideas to share, please visit the **DFRobot Forum** (<https://www.dfrobot.com/forum/>).

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