Shenzhen Vkinging Electronic Co. Ltd

VK701W wireless data acquisition card

VK701W WIFI high-speed 24-bit data acquisition card

——Precision Accurate Speed Reliable

Description

VK701W is a wireless high-speed data acquisition card with 4-channel true differential input, 24-bit resolution, maximum sampling rate of 400KSPS, and precision pre-gain amplification.The product adopts a number of high-precision 24-bit ADC units and the pre-differential amplifier module developed by the company over the years, so that the product has the advantages of high speed, high resolution, high precision, ultra-low noise, high suppression ratio, wide measuring range and low temperature bleaching. It is suitable for various occasions of precise and high-speed acquisition.

LAN communication adopts TCP/IP and original exchange communication protocol and built-in packet loss prevention algorithm, which can ensure stable transmission and collection of data without loss for a long time.

Acquisition card extended to series version, USB VK701, LAN high-speed transmission type see VK701W.

VK701W acquisition card adopts all-metal shield, which can be used in industrial occasions with strong interference, and has the advantages of moisture-proof, shockproof and anti-interference.

characteristic

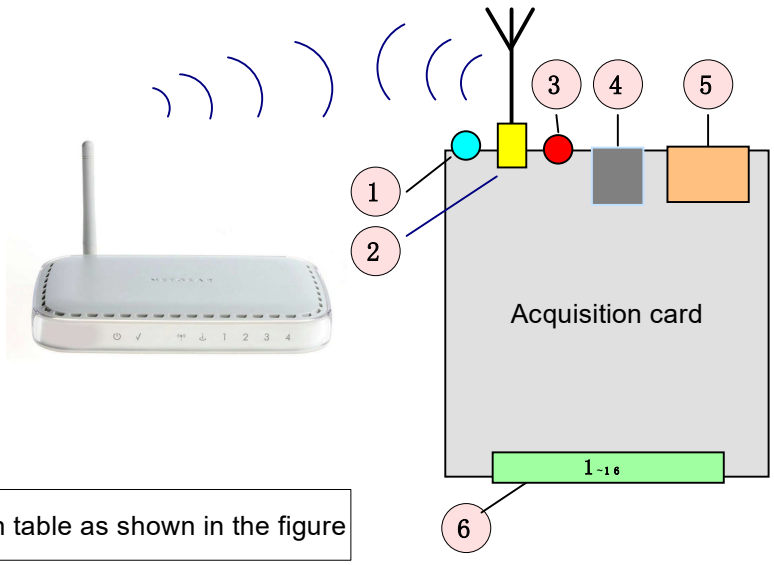
- High precision,high resolution: 24-bit resolution
- Ultra-low noise pre-differential amplification:Minimum measurement 0.1uV
- High rate synchronous acquisition: Single channel maximum 100kSPS(100k points per second), 400ksps at 4 channels
- input range: 0 ~ ± 10V
- Counting/frequency measurement : Counting or frequency measurement
- Integrate 2-channel PWM output:16 bit adjustable PWM
- Integrate 1 channel DAC output :0 ~ 3.3 V analog
- Metal shield housing: Strong anti-interference ability

Application

- Wireless single/multi-card data acquisition
- High resolution signal measurement
- Signal trigger acquisition system
- Multi-card networking data acquisition

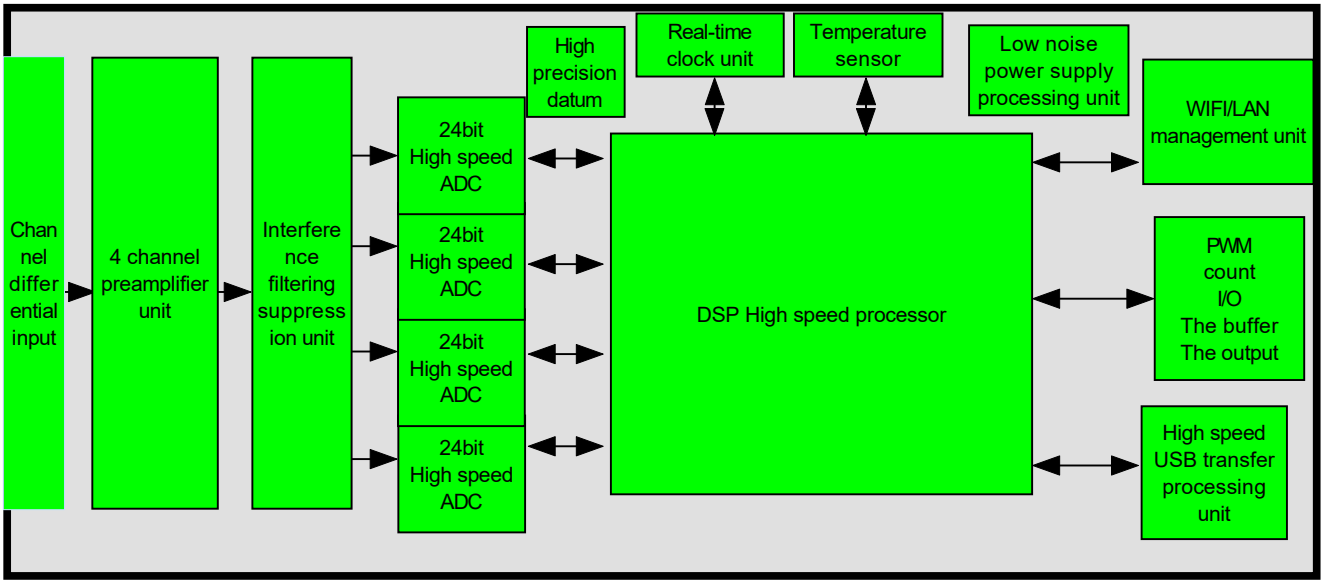
Acquisition card port diagram:

1. Acquisition status indicator light
2. Wireless acquisition transmitting antenna
3. USB connection indicator light
4. USB/ power port
5. Extend application terminals
6. Input and output interface, function table as shown in the figure



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
+5V	P0.1 Aout	P0.2 PWM	P0.3 PWM	P0.4 CNT	DGND	+ Ain4 -		AGND	+ Ain3 -		AGND	+ Ain2 -		+ Ain1 -	

The system block diagram



Port functions

port number	name	function	note
1	**+5V**	5V output power supply for digital power supply output, also can be used as power supply input.	Do not connect the power input backwards.
2	**P0.1/ Aout**	• P0.1—— Configured as a digital input/output port • AOUT——Configured as an analog output port, it can output 0~3.3V	Function 2 choose 1
3	**P0.2/ PWM1**	• P0.2——Configured as a digital input/output port • PWM1——Configured as A PWM output port	Function 2 choose 1
4	**P0.3/ PWM2**	• P0.3——Configured as a digital input/output port • PWM2——Configured as A PWM output port	Function 2 choose 1
5	**P0.4/ CNT**	• P0.4——Configured as a digital input/output port • CNT——Configured as a counter/frequency meter input port • Ext Trig——Configure external trigger acquisition	Function 3 choose 1
6	**DGND**	Digital earth	
7	**Ain4+**	Analog input positive input terminal - channel 4	If the ground wire is connected to the digital terminal during the analog terminal acquisition, digital interference may be introduced to reduce the acquisition accuracy.
8	**Ain4-**	Analog input negative input terminal - channel 4	
9	**AGND**	Analog ground	
10	**Ain3+**	Analog input positive input terminal - channel 3	
11	**Ain3-**	Analog input negative input terminal - channel 3	
12	**AGND**	Analog ground	
13	**Ain2+**	Analog input positive input terminal - channel 2	
14	**Ain2-**	Analog input negative input terminal - channel 2	
15	**Ain1+**	Analog input positive input terminal - channel 1	
16	**Ain1-**	Analog input negative input terminal - channel 1	

VK701W wireless data acquisition card

Integrated electrical parameters

Project	Unit	Typical	Range
USB supply voltage:	V	5	4.5~5.5
USB power current:	mA	450	400~500
ADC analog port input voltage	V		+-10
Digital port input VL low level	V	0	-0.3~1
Digital port input VH high level	V	3.3	2~5.5
Digital port output voltage	V	3.3	3.2~3.4
Digital port output drive current (high current output)	mA	10	
Digital port input absorption current (5V input voltage)	uA	170	
ADC maximum sampling rate	kps		100
Minimum resolution voltage (input range selected -1mV~+1mV)	uV		0.1
Aout output voltage	V		0~3.3
PWM output frequency (P0.2/PWM1, P0.3/PWM2 ports)	Hz		0~100k
PWM duty ratio (P0.2/PWM1, P0.3/PWM2 ports)	%		0~100
Counter input maximum frequency (P0.4/CNT port)	Hz		100K
The counter enters the maximum value		2 ^ 64 joules	
Working temperature:	c		-20~ 85
Storage temperature	c		-40~ 105
Physical size (length, width and height)	mm	110*82*24	Connector length is not included.

Use absolute maximum values safely

Project	Unit		
USB supply voltage:	V	-1~+6	*Exceeding the absolute maximum may damage the device and cause irreparable damage.
ADC analog port	V	+-200（There are protective circuits inside.)	
Digital ports	V	+-200（There are protective circuits inside.)	
DAC output port	V	-1~+6	
All Port Electrostatic Input (ESD)	V	2000	

ADC analog conversion unit

ADC detailed electrical parameters

Item	Unit	Typical	Note
Differential input common mode rejection ratio(CMRR)	dB	130	
Input bias current	nA	1	
Input bias voltage	uv	10	
Input equivalent voltage noise	nVp-p	200	When the input range is + - 10V, the maximum value is 400
Input equivalent current noise	pAp-p	1	The maximum value is 2
Equivalent input capacitance	pF	400	
Input resistance	GΩ	1	
Maximum temperature drift of amplification unit	ppm/°C	6	

Input range vs noise

Program set	Corresponding measurement range	Background noise	NOTE
0	-10V~+10V	0.3mV	ADC background noise is white noise, which will be superimposed on the measurement results (*note 2)
1	-5V~+5V	0.1mV	
2	-2.5V~+2.5V	60uV	
3	-1V~+1V	25uV	
4	-500mV~+500mV	15uV	
5	-100mV~+100mV	6.5uV	
6	-20mV~+20mV	6uV	
7	-1mV~+1mV	5uV	

Sample rate vs effective resolution

sampling rate	Effective resolution (*note 1)	Note
1 ~ 4Ksps	21bit	When the sampling rate is high, the greater the noise of ADC and surrounding internal devices, so as to reduce the effective resolution(*note2)
4K~15Ksps	20bit	
15k~35Ksps	19bit	
35k~64Ksps	17bit	
64k~100Ksps	16bit	

note 1: The effective resolution is all ADC characteristics
note 2: For signal acquisition, the background noise of ADC and the effective resolution corresponding to the sampling rate shall be considered at the same time

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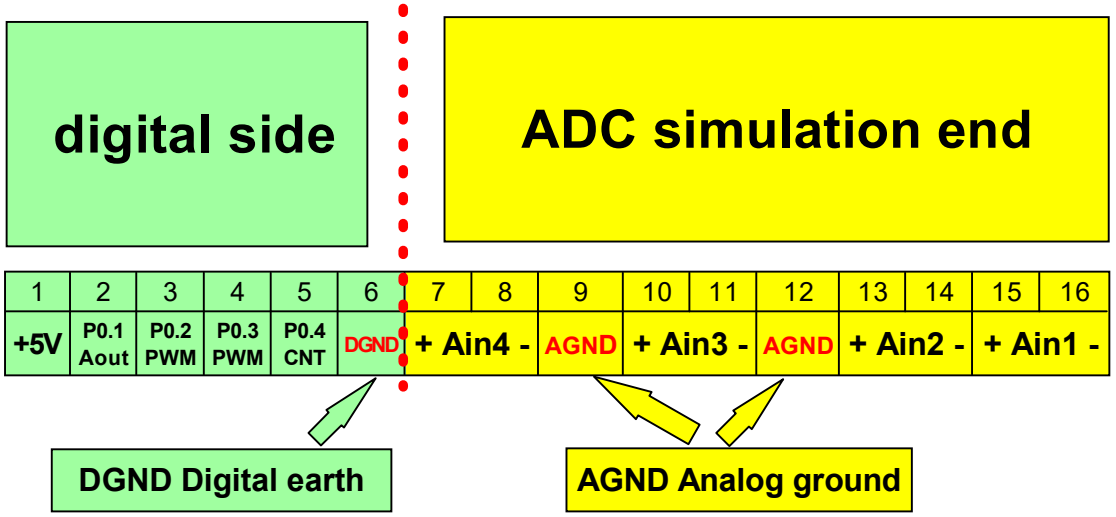
Precautions for Use

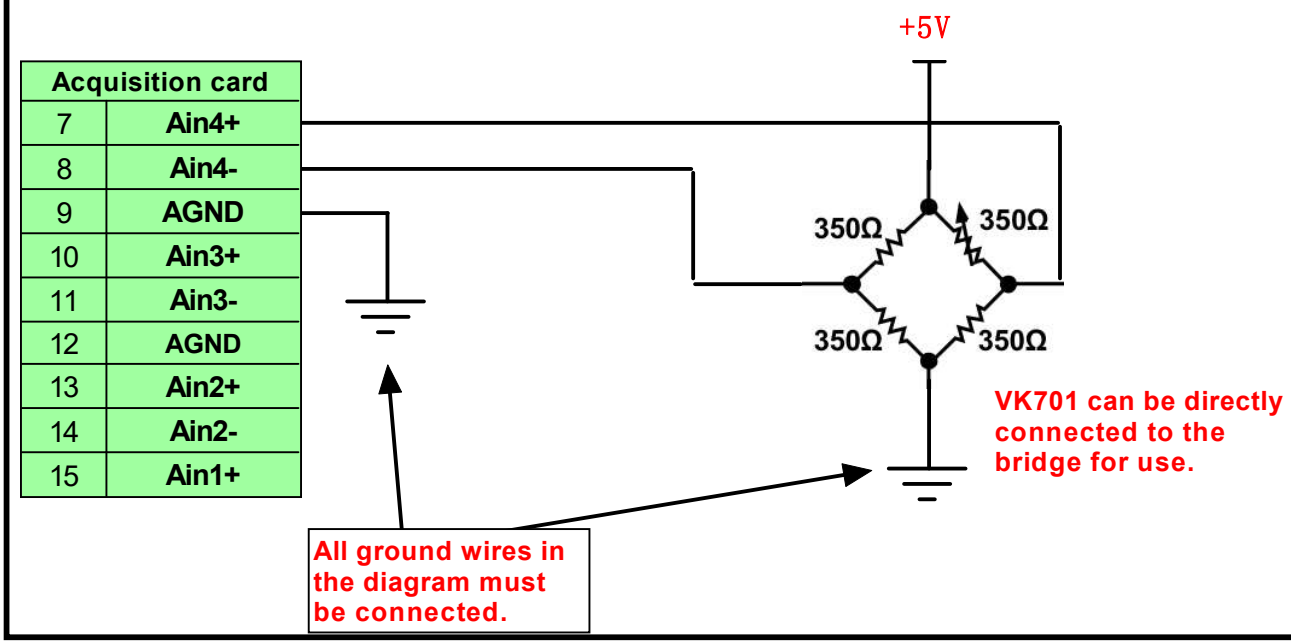
The ground wire is divided into digital ground and analog ground.

Input ports 1~6 are digital terminals (including Aout output), and 7~16 are analog ports.
When in use, digital input and AOUT output should be used in conjunction with digital ground (DGND), while ADC acquisition terminal should be used in conjunction with analog ground (AGND), so as to avoid digital interference of digital input to analog input.



Differential mode of ADC input

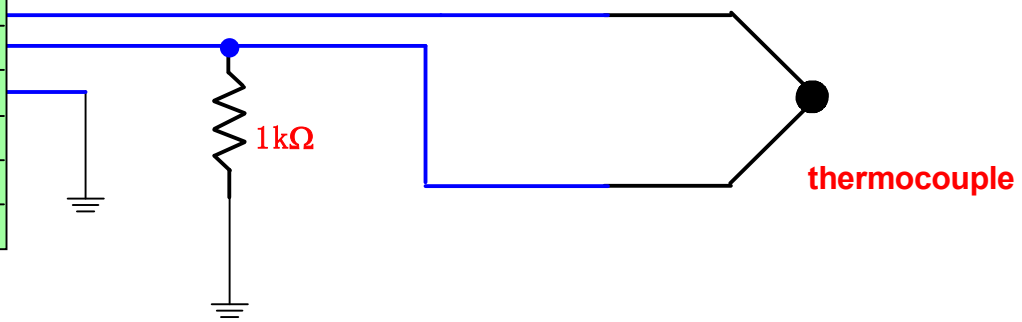
Differential mode is the least noise input mode, which can effectively suppress all kinds of common mode interference.But care must be taken to provide the correct input loop to the input end.The correct common ground is the first step in ensuring the input loop.



Differential mode of ADC input

If there is no common ground on the input side, you can create the input return path as follows.

Acquisition card	
7	Ain4+
8	Ain4-
9	AGND
10	Ain3+
11	Ain3-
12	AGND
13	Ain2+
14	Ain2-
15	Ain1+



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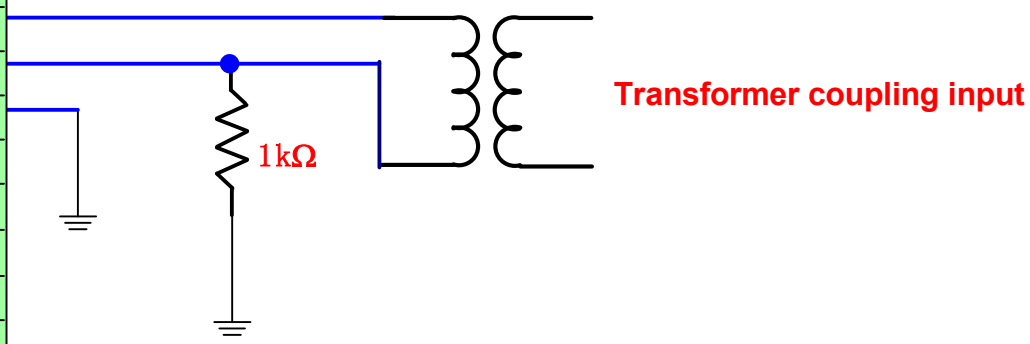

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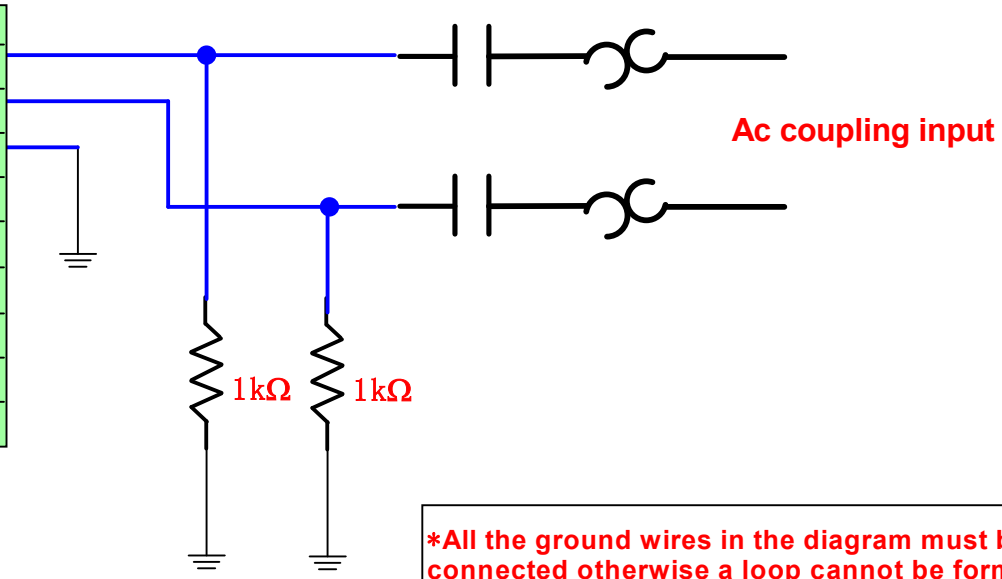
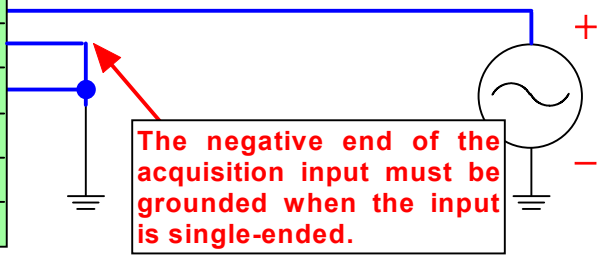


*All the ground wires in the diagram must be connected otherwise a loop cannot be formed.

Application of single-ended input to ADC input

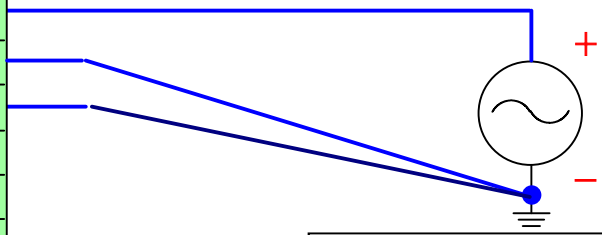
When the input is single, the negative end of the differential input must be grounded.
When the acquisition card is used to collect non-differential signals, it can also give full play to the performance of high suppression ratio and eliminate the noise caused by ground wire.

Acquisition card	
7	Ain4+
8	Ain4-
9	AGND
10	Ain3+
11	Ain3-
12	AGND
13	Ain2+
14	Ain2-
15	Ain1+



Better connection

Acquisition card	
7	Ain4+
8	Ain4-
9	AGND
10	Ain3+
11	Ain3-
12	AGND
13	Ain2+
14	Ain2-
15	Ain1+

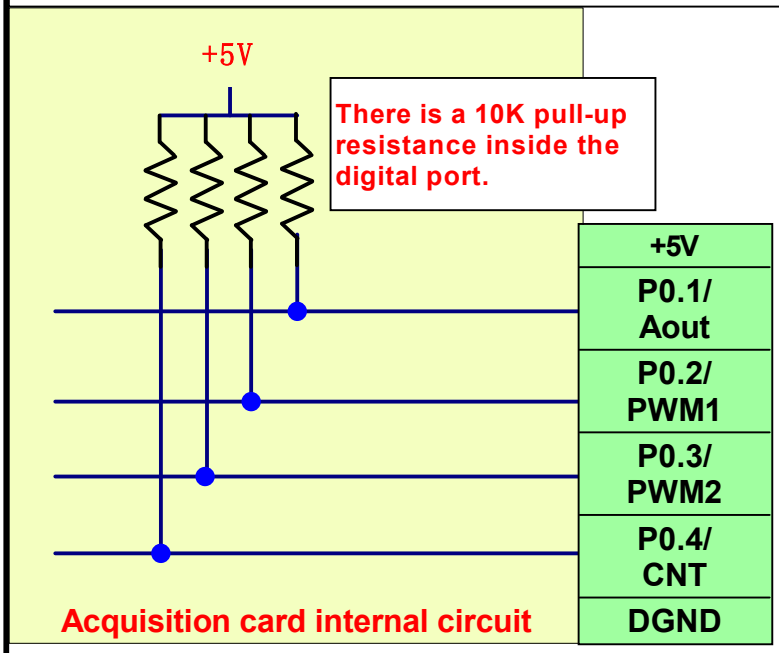


The negative end is connected to the remote input ground end, which can suppress the noise introduced by the ground circuit.

*All the ground wires in the diagram must be connected otherwise a loop cannot be formed.

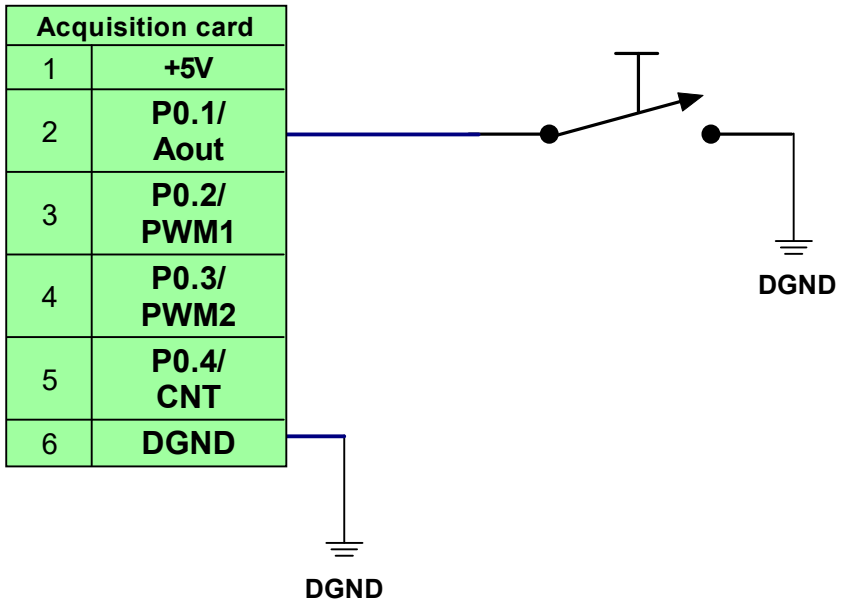
Digital port as input application

When the acquisition card is used as input, its internal pull-up resistance can be more convenient to use.



Key in to make

When the acquisition card is used as input, its internal pull-up resistance can be more convenient to use.

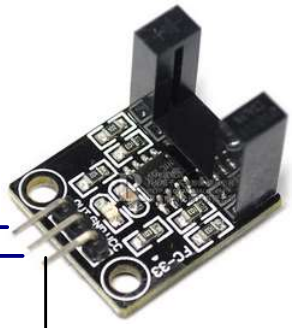


*All the ground wires in the diagram must be connected otherwise a loop cannot be formed.

Use an internal 5V power supply to supply the sensor input

When the acquisition card is used as input, its internal pull-up resistance can be more convenient to use.

Acquisition card	
1	+5V
2	P0.1/ Aout
3	P0.2/ PWM1
4	P0.3/ PWM2
5	P0.4/ CNT
6	DGND



DGND

DGND

Any digital port can be connected to digital temperature sensor

Any digital port of the acquisition card can be connected with 18B20 digital temperature sensor to directly read the temperature value.

Acquisition card	
1	+5V
2	P0.1/ Aout
3	P0.2/ PWM1
4	P0.3/ PWM2
5	P0.4/ CNT
6	DGND

DGND

DGND

Digital temperature sensor wire length up to 5 meters.

LED light status and indication

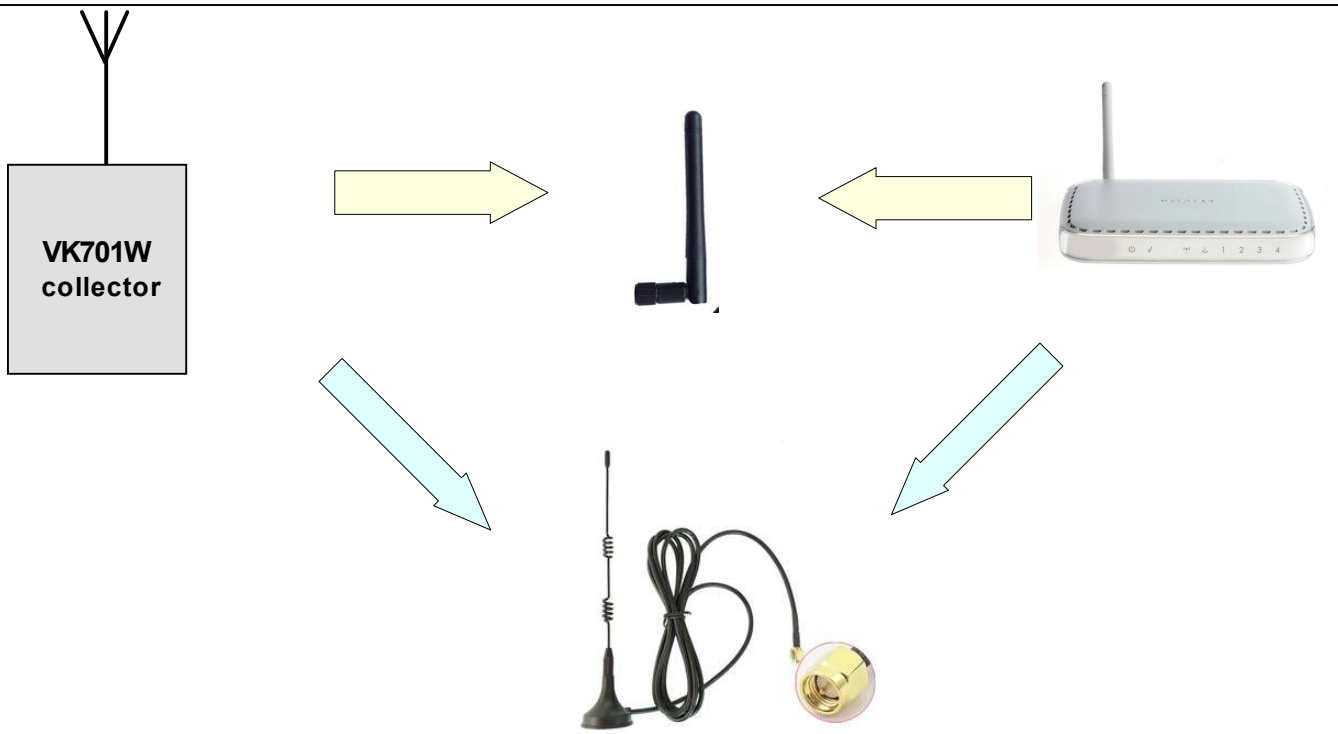
Power status indicator (beside USB interface)

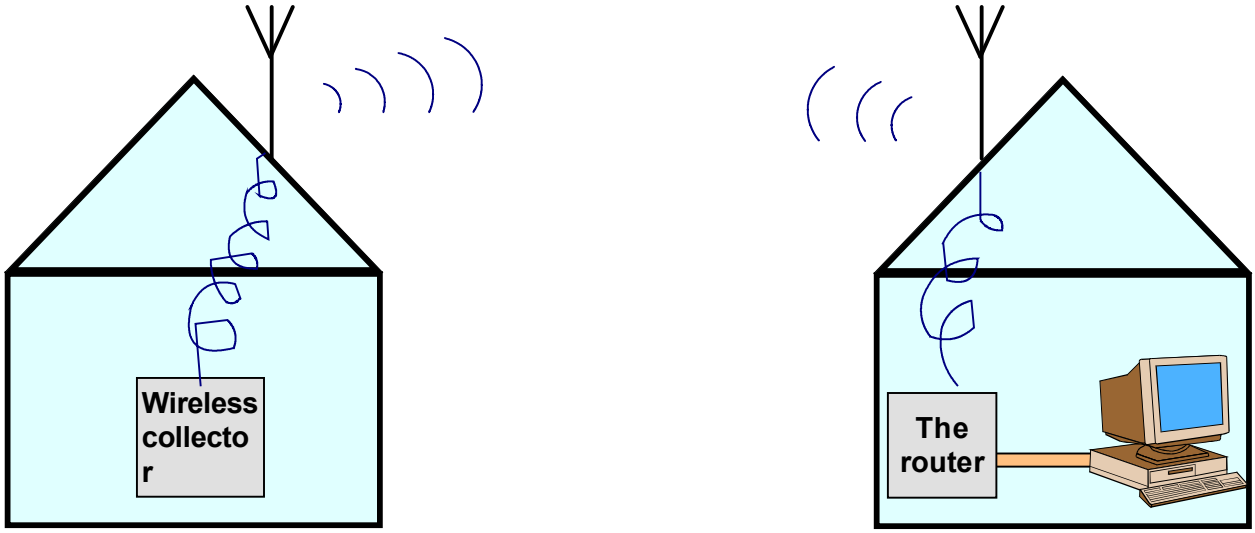
Network interface status indicator

	bright	destroy	flashing
Green light	Data not sent	normal	
Yellow light	Data in transit	No transmission	Data in transit

Selection of antenna for wireless transmission

If the wireless environment is good, a 3.5dB gain antenna with a length of 10CM can be provided by default.If the environment is not ideal or the transmission distance is longer, we can choose another high gain 7dBI omnidirectional antenna.Or users can make their own WIFI antenna, easy to lead to more convenient transmission and reception of the open.





VK701W WIFI high-speed precision data acquisition card

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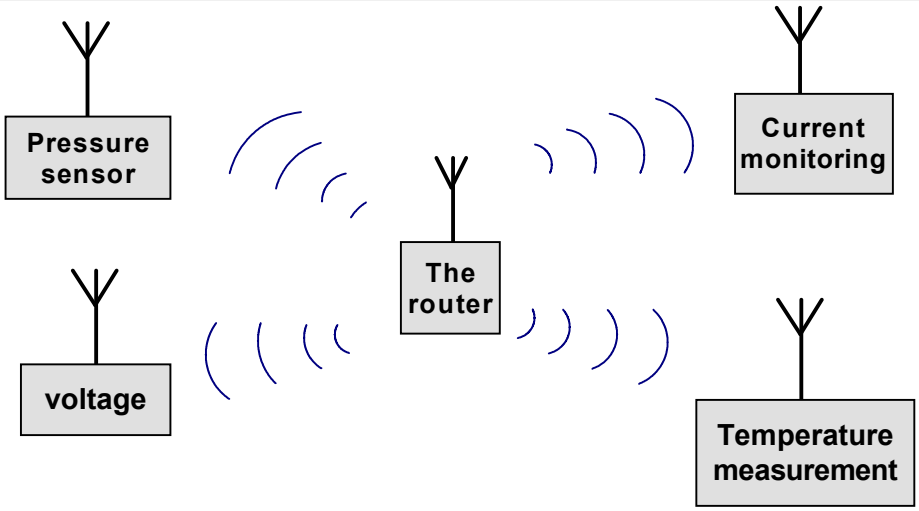
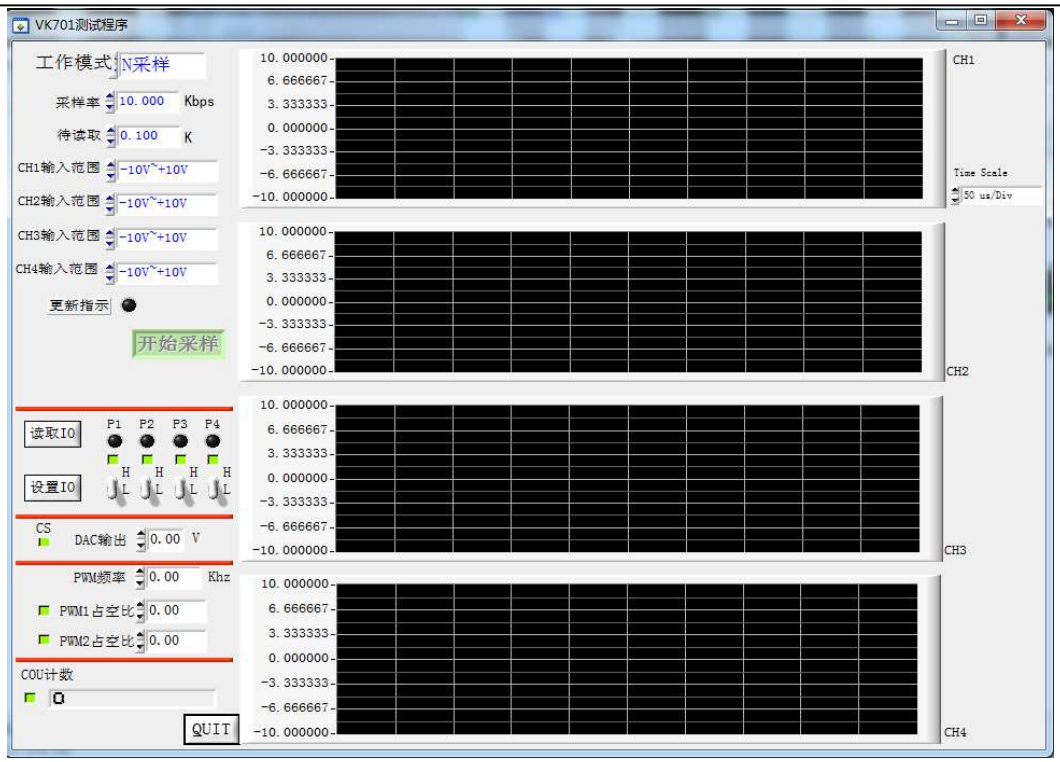
Multiple wireless front-end acquisition can be done simultaneously

This collection system supports a collection terminal to carry out time-sharing collection for multiple collection front ends, which can easily build a multi-point measurement and monitoring system. A single receiver can support up to 255 collection front ends, but the rate and transmission efficiency will decrease with the increase of the number.



PC software

The wireless collector can be independently powered, and it adopts TCP/IP protocol to exchange data of various receiving terminals through wireless WIFI data transmission.



Built-in wireless routing unit parameters

project		
Wireless protocol	IEEE802.11 b/g/n	
Wireless rate	Maximum 150 MBPS	
Digital ports	+-200（There are protective circuits inside.)	*
RF power	Maximum 18dbm	
Wireless transmission distance	100 m（Open field）	

Physical dimension drawing