1. JY-5325 Specifications

1.1 Overview

JY-5325 is a high-performance, multifunctional synchronous analog output and input data acquisition module designed for complex test and measurement applications. It includes 8 synchronous analog acquisitions, with a sampling rate of up to 5 MS/s per channel, and 8 synchronous analog outputs, with an output rate of up to 1 MS/s per channel. Additionally, the JY-5325 is equipped with 8 high-speed digital I/O or 2 counter/timer, providing users with more functional options and flexibility. The high resolution of 16 bits ensures the accuracy of data acquisition and output. This module is suitable for multi-channel synchronous output and acquisition testing in fields such as production testing, ultrasonic and sonar testing, and big physics.

Please download JYTEK <JYPEDIA>, you can quickly inquire the product prices, the key features and available accessories.

1.2 Main Features

- Analog Input
  - High accuracy: 280 ppm
  - 8 differential 16 bits analog input channels
  - 5 MS/s sampling rate per channel
  - 4 voltage ranges: ±1V/±2V/±5V/±10V
  - 100M samples FIFO buffer for analog input
- Analog Output
  - High accuracy: 150 ppm
  - 8 single-ended 16-bit analog output channels
  - 1 MS/s update rate per channel
  - Voltage range：±10 V
  - 100M samples FIFO buffer for analog output
- DIO Features
  - 8 hardware timed digital I/O
  - Maximum clock frequency of 10 MHz
  - Each DIO channelcan be controlled
- Counter Features
  - 2 channels of 32-bit general-purpose timers/counters
  - Internal clock frequency of 100 MHz
  - Edge counting/frequency measurement/period measurement/pulse measurement/dual-edge separation
  - Quadrature (x1/x2/x4)encoder, dual pulse encoder
  - Single pulse, limited pulse, continuous pulse
  - PWM output

1.3 Hardware Specifications

1.3.1 Analog Input Specifications

Analog Input	**JY-5325**
Number of Channels	8
Input modes	Differential
ADC Resolution	16 bits
Sampling Rate	5 MS/s/ch
Coupling	DC
Input Ranges	±1 V, ±2 V, ±5 V, ±10 V
Max working voltage	±10.83 V(To AIGND)
Input Impedance	5.3 GΩ || 0.5 pF
Crosstalk(at 100kHz)	Adjacent channel: -90 dB; Non-adjacent channel: -105dB
Overvoltage protection	ON: ±25 V ; OFF: ±15 V
Input current during overvoltage protection	±20 mA
CMRR (DC to 50Hz)	-105 dB
Bandwidth	2.2 MHz
THD	-80 dB
FIFO	100M Samples

Table 1 Analog Input Specifications

1.3.2 Basic DC AI Accuracy

JY-5325 Basic Accuracy = ±(% Reading+% Range)

Nominal Range (V)	24 Hour Tcal ±1C°			90 Day Tcal ±5C°			Temperature Coefficients(/C°)			24 Hr Full Scale Accuracy	90 Day Full Scale Accuracy
10	0.005	+	0.021	0.017	+	0.021	0.0008	+	0.0002	2600 uV	3400 uV
5	0.005	+	0.019	0.016	+	0.019	0.0008	+	0.0002	1200 uV	1800 uV
2	0.005	+	0.018	0.015	+	0.018	0.0007	+	0.0002	440 uV	650 uV
1	0.005	+	0.023	0.014	+	0.027	0.0006	+	0.0002	280 uV	410 uV

Accuracy valid to 100% of full range

Table 2 Basic DC AI Accuracy

1.3.3 Dynamic Performance

AI-Bandwidth

Range (V)	-3 dB Bandwidth (MHz)
±1 V	1.6
±2 V	2
±5 V	2.1
±10 V	2.2

Table 3 AI-Bandwidth

System Noise

Range(V)	10	5	2	1
System Noise(μVrms)	180	110	55	34

Table 4 System Noise

CMRR (dB at 50/60 Hz)

Range(V)	CMRR (dB at 50/60 Hz)
±1 V	110
±2 V	110
±5V	105
±10V	100

Table 5 CMRR (dB at 50/60 Hz)

Crosstalk (dB at 100 kHz)

Type	Range(V)	Crosstalk (dB at 100 kHz)
Adjacent channel	±1 V	-100
	±2 V	-105
	±5V	-110
	±10V	-120
Non-adjacent channel	±1 V	-100
	±2 V	-106
	±5V	-114
	±10V	-120

Table 6 Crosstalk (dB at 100 kHz)

1.3.4 Analog Output Specifications

Number of channels	8
Output type	SE, Voltage output
Resolution	16 bits
Unscaled data format	Signed integer
Monotonicity	16 bits
Maximum update rate (4 channels, 1 channel per DAC)[1]	2 MS/s
Maximum update rate (8 channles)	1 MS/s
Output range	±10V
Output coupling	DC
Output impedance	0.2 Ω
Output current drive	±10mA
Overdrive protection	Power on : ±15 V Power off : ±10 V
Overdrive current	15mA
Power-on state	0 V
Power-on/off glitch	2.5V peak for 100ms
Data transfers	DMA
Slew rate	20 V/μs
Noise	400 μVrms, DC to 1 MHz
Nominal Range Positive Full Scale	10 V
Nominal Range Negative Full Scale	-10 V
FIFO buffer size	100 M Samples(all channels share)
1：Each DAC have 2 channels.	

Table 7 Analog Output Specifications

1.3.5 Basic DC AO Accuracy

JY-5325 Basic Accuracy = ±(% Reading+% Range)								
Nominal Range (V)	24 Hour Tcal ±1°C			90 Days Tcal ±5°C			24 Hr Full Scale Accuracy	90 Days Full Scale Accuracy
10	0.002	+	0.004	0.005	+	0.01	510 uV	1300 uV

Table 8 Basic DC AO Accuracy

1.3.6 Digital I/O Specifications

DIO	**JY-5325**
Number of channels	Line<0..7>
Ground reference	D GND
Directional control	Independent control of each line
DO FIFO	24M samples
DI FIFO	24M samples
DI max sample clock rate	10 MHz
DO max update clock rate	10 MHz
Initial state	Input
Digital Input	Logic Low: V_{IL} Min : 0 V / Max : 1.0 V Logic High: V_{IH} Min : 2 V / Max : 5.3 V
Digital Output	Logic Low : 0 V, I_{OL} Max: 24 mA Logic High : 2.6 V～5 V, I_{OH}: -24 mA～0 mA
Overvoltage Protection	Continuous 30 mA -3.9 V～ 8.9 V; Instantaneous 200 mA -25 V～ 25 V; Duty cycle of instantaneous current pulse does not exceed 15%

Table 9 Digital I/O Specifications

1.3.7 PFI Specifications

PFI	JY-5325
Number of channels	8 PFI
Ground Reference	DGND
Initial state	Input

Table 10 PFI Specifications

1.3.8 Counter I/O Specifications

Counter I/O	JY-5325
Number of channels	2
Resolution	32
CI	edge count,period measurement,frequency measurement, pulse width measurement,two-edge interval measurement, quadrature encoder, etc.
CO	Single,finite and continuous pulse
Clock	100 MHz
FIFO	4M Samples
Input	Gate，Source，Aux
Output	OUT

Table 11 Counter I/O Specifications

1.3.9 Power Specification

Power Requirement

+12V	1.82A
+3.3V	2.48A

Table 12 Power Requirement

1.3.10 Physical and Environment

PXIe bus interface

Form factor	Standard 3U PXI
Slot compatibility	x1 and x4
DMA channel	AI, AO, DI, DO

Table 13 PXIe bus interface

Operating Environment

Termperature Range	0 to 55 degree of Celcius
Humidity	10% to 90%

Table 14 Operating Environment

Storage Environment

Termperature Range	-40 to 71 degree of Celcius
Humidity	5% to 95%

Table 15 Storage Environment

2. Order Information

- PXIe-5325 (PN: JY8134536-01)
  8-ch AI (16-bit, 5 MS/s/ch) 8-ch AO (16-bit, 1 MS/s/ch) , 8 DIO, PXIe Simultaneous sampling Multifunction I/O Module

- Accessories
  TB-53 (PN: JY1368485-01) 68-Pin SCSI with BNC Terminal Block for JY-5300 Series
  TB-68 (PN: JY2000068-04) 68-Pin SCSI Shielded I/O Connector Block
  ACL-1016868-1 (PN: JY7996916-01) 1 M 68pin VHDC-SCSI twisted pair cable
  ACL-1016868-2 (PN: JY7996916-02) 2 M 68pin VHDCI-SCSI twisted pair cable

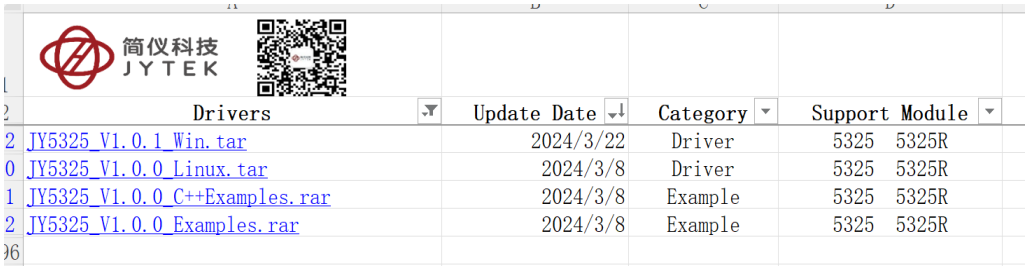
Table of Contents

3. Introduction

This chapter presents the information how to use this manual and how to quick start if you are already familiar with Microsoft Visual Studio and C# programming language.

3.1 Learn by Example

JYTEK has added **Learn by Example** in this manual. We provide many sample programs for this device. Please download the sample programs for this device. You can download a JYPEDIA excel file from our web www.jytek.com. Open JYPEDIA and search for JY-5325 in the driver sheet, select **JY-5325 Examples.zip**. In addition to the download information, JYPEDIA also has a lot of other valuable information, JYTEK highly recommend you use this file to obtain information from JYTEK.



	Drivers	Update Date	Category	Support Module
2	JY5325_V1.0.1_Win.tar	2024/3/22	Driver	5325 5325R
0	JY5325_V1.0.0_Linux.tar	2024/3/8	Driver	5325 5325R
1	JY5325_V1.0.0_C++Examples.rar	2024/3/8	Example	5325 5325R
2	JY5325_V1.0.0_Examples.rar	2024/3/8	Example	5325 5325R

Figure 1 JYPEDIA Information

4. Hardware Specifications

4.1 Front Panel and Pin Definition

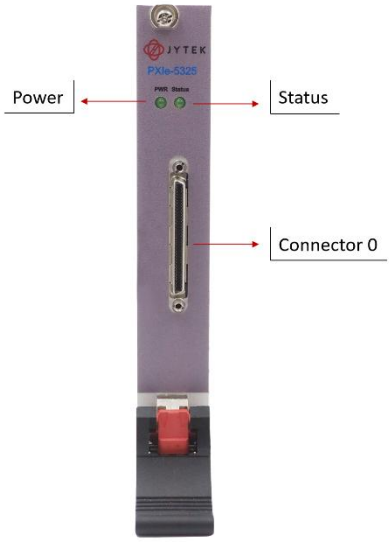


Figure 2 JY-5325 Front Panel

4.2 Pin Definition

Connector 0			
Pin	Signal Name	Pin	Signal Name
1	PFI0 / P0.0	35	DGND
2	PFI1 / P0.1	36	DGND
3	PFI2 / P0.2	37	DGND
4	PFI3 / P0.3	38	DGND
5	PFI4 / P0.4	39	DGND
6	PFI5 / P0.5	40	DGND
7	PFI6 / P0.6	41	DGND
8	PFI7 / P0.7	42	DGND
9	AO_GND	43	AO_GND
10	AO0	44	AO_GND
11	AO1	45	AO_GND
12	AO2	46	AO_GND
13	AO3	47	AO_GND
14	AO4	48	AO_GND
15	AO5	49	AO_GND
16	AO6	50	AO_GND
17	AO7	51	AO_GND
18	AI_GND	52	AI_GND
19	AI7-	53	AI7+
20	AI_GND	54	AI_GND
21	AI6-	55	AI6+
22	AI_GND	56	AI_GND
23	AI5-	57	AI5+
24	AI_GND	58	AI_GND
25	AI4-	59	AI4+
26	AI_GND	60	AI_GND
27	AI3-	61	AI3+
28	AI_GND	62	AI_GND
29	AI2-	63	AI2+
30	AI_GND	64	AI_GND
31	AI1-	65	AI1+
32	AI_GND	66	AI_GND
33	AI0-	67	AI0+
34	AI_GND	68	AI_GND

Pin	Signal Name
1	CTR0_Source/A
2	CTR0_Gate/Z
3	CTR0_AUX/B
4	CTR0_ OUT
5	CTR1_Source/A
6	CTR1_Gate/Z
7	CTR1_AUX/B
8	CTR1_ OUT

Table 16 JY-5325 Connector Pin Definition

5. Software

5.1 System Requirements

JY-5325 boards can be used in a Windows or a Linux operating system.

Microsoft Windows: Windows 7 32/64 bit, Windows 10 32/64 bit.

Linux Kernel Versions: There are many Linux versions. It is not possible JYTEK can support and test our devices under all different Linux versions. JYTEK will at the best support the following Linux versions.

Linux Version
Ubuntu LTS
16.04： 4.4.0-21-generic(desktop/server)
16.04.6：4.15.0-45-generic(desktop) 4.4.0-142-generic(server)
18.04： 4.15.0-20-generic(desktop) 4.15.0-91-generic(server)
18.04.4：5.3.0-28-generic (desktop) 4.15.0-91-generic(server)
Localized Chinese Version
中标麒麟桌面操作系统软件（兆芯版）V7.0（Build61）: 3.10.0-862.9.1.nd7.zx.18.x86_64
中标麒麟高级服务器操作系统软件V7.0U6: 3.10.0-957.el7.x86_64

Table 17 Supported Linux Versions

5.2 System Software

When using the JY-5325 in the Window environment, you need to install the following software from Microsoft website:

Microsoft Visual Studio Version 2015 or above,

.NET Framework version is 4.0 or above.

.NET Framework is coming with Windows 10. For Windows 7, please check .NET Framework version and upgrade to 4.0 or later version.

Given the resources limitation, JYTEK only tested JY-5325 be with .NET Framework 4.0 with Microsoft Visual Studio 2015. JYTEK relies on Microsoft to maintain the compatibility for the newer versions.

5.3 C# Programming Language

All JYTEK default programming language is Microsoft C#. This is Microsoft recommended programming language in Microsoft Visual Studio and is particularly suitable for the test and measurement applications. C# is also a cross platform programming language.

5.4 JY-5325 Series Hardware Driver

After installing the required application development environment as described above, you need to install the JY-5325 hardware driver.

JYTEK hardware driver has two parts: the shared common driver kernel software (FirmDrive) and the specific hardware driver.

Common Driver Kernel Software (FirmDrive): FirmDrive is the JYTEK's kernel software for all hardware products of JYTEK instruments. You need to install the FirmDrive software before using any other JYTEK hardware products. FirmDrive only needs to be installed once. After that, you can install the specific hardware driver.

Specific Hardware Driver: Each JYTEK hardware has a C# specific hardware driver. This driver provides rich and easy-to-use C# interfaces for users to operate various JY-5325 function. JYTEK has standardized the ways which JYTEK and other vendor's DAQ boards are used by providing a consistent user interface, using the methods, properties and enumerations in the object-oriented programming environment. Once you get yourself familiar with how one JYTEK DAQ card works, you should be able to know how to use all other DAQ hardware by using the same methods.

Note that this driver does not support cross-process, and if you are using more than one function, it is best to operate in one process.

5.5 Install the SeeSharpTools from JYTEK

To efficiently and effectively use JY-5325 boards, you need to install a set of free C# utilities, SeeSharpTools from JYTEK. The SeeSharpTools offers rich user interface functions you will find convenient in developing your applications. They are also needed to run the examples come with JY-5325 hardware. Please register and down load the latest SeeSharpTools from our website, www.jytek.com.

5.6 Running C# Programs in Linux

Most C# written programs in Windows can be run by MonoDevelop development system in a Linux environment. You would develop your C# applications in Windows using Microsoft Visual Studio. Once it is done, run this application in the MonoDevelop environment. This is JYTEK recommended way to run your C# programs in a Linux environment.

If you want to use your own Linux development system other than MonoDevelop, you can do it by using our Linux driver. However, JYTEK does not have the capability to support the Linux applications. JYTEK completely relies upon Microsoft to maintain the cross-platform compatibility between Windows and Linux using MonoDevelop.

6. Calibration

JY-5325 Series boards are precalibrated before the shipment. We recommend you recalibrate JY-5325 board periodically to ensure the measurement accuracy. A commonly accepted practice is one year. If for any reason, you need to recalibrate your board, please contact JYTEK.

7. Using JY-5325 in Other Software

While JYTEK's default application platform is Visual Studio, the programming language is C#, we recognize there are other platforms that are either becoming very popular or have been widely used in the data acquisition applications. Among them are Python, C++ and LabVIEW. This chapter explains how you can use JY-5325 DAQ card using one of this software.

7.1 Python

JYTEK provides and supports a native Python driver for JY-5325 boards. There are many different versions of Python. JYTEK has only tested in CPython version 3.5.4. There is no guarantee that JYTEK python drivers will work correctly with other versions of Python.

If you want to be our partner to support different Python platforms, please contact us.

7.2 C++

We recommend our customers to use C# drivers because C# platform deliver much better efficiency and performance in most situations. We also provide C++ drivers and examples in the Qt IDE, which can be downloaded from web. However, due to the limit of our resources, we do not actively support C++ drivers. If you want to be our partner to support C++ drivers, please contact us.

7.3 LabVIEW

LabVIEW is a software product from National Instruments. JYTEK does not support LabVIEW and will no longer provide LabVIEW interface to JY-5325 boards. Our third-party partners may have LabVIEW support to JY-5325 boards. We can recommend you if you want to convert your LabVIEW applications to C# based applications.

8. About JYTEK

8.1 JYTEK China

Founded in June, 2016, JYTEK China is a leading Chinese test & measurement company, providing complete software and hardware products for the test and measurement industry. The company has evolved from re-branding and reselling PXI(e) and DAQ products to a fully-fledged product company. The company offers complete lines of PXI, DAQ, USB products. More importantly, JYTEK has been promoting open-sourced based ecosystem and offers complete software products. Presently, JYTEK is focused on the Chinese market. Our Shanghai headquarters and production service center have regular stocks to ensure timely supply; we also have R&D centers in Xi'an and Chongqing. We also have highly trained direct technical sales representatives in Shanghai, Beijing, Tianjin, Xi'an, Chengdu, Nanjing, Wuhan, Guangdong, Haerbin, and Changchun. We also have many patners who provide system level support in various cities.

8.2 JYTEK Software Platform

JYTEK has developed a complete software platform, SeeSharp Platform, for the test and measurement applications. We leverage the open sources communities to provide the software tools. Our platform software is also open sourced and is free, thus lowering the cost of tests for our customers. We are the only domestic vendor to offer complete commercial software and hardware tools.

8.3 JYTEK Warranty and Support Services

With our complete software and hardware products, JYTEK is able to provide technical and sales services to wide range of applications and customers. In most cases, our products are backed by a 1-year warranty. For technical consultation, pre-sale and after-sales support, please contact JYTEK of your country.

9. Statement

The hardware and software products described in this manual are provided by JYTEK China, or JYTEK in short.

This manual provides the product review, quick start, some driver interface explanation for JYTEK JY-5325 Series family of multi-function data acquisition boards. The manual is copyrighted by JYTEK.

No warranty is given as to any implied warranties, express or implied, including any purpose or non-infringement of intellectual property rights, unless such disclaimer is legally invalid. JYTEK is not responsible for any incidental or consequential damages related to performance or use of this manual. The information contained in this manual is subject to change without notice.

While we try to keep this manual up to date, there are factors beyond our control that may affect the accuracy of the manual. Please check the latest manual and product information from our website.

Shanghai Jianyi Technology Co., Ltd.

Address: Room 201, Building 3, NO.300 Fangchun Road, Shanghai.

Post Code: 201203

Tel: 021-5047 5899

Website: www.jytek.com