



**SMARTLAB**

**USB INDUSTRY CONTROL BOARD**

**OPERATION MANUAL**



**Decision Group Inc.**



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# CHAPTER 1

## INTRODUCTION

The USB industry control board provides 8 ports digital input/output channels, each port contains 8 digital input/output channels, which allows to connect 8 channel relay output/photo isolator input board, 8 channel SSR relay output/photo isolator input board, 16 channel relay output board, 16 channel photo isolator input board, and industrial DIN rail mountable terminal block adapter.

The USB industry control board provides Plug and Play (PnP) features, it is a programmable I/O interface card for PC/486, Pentium, or compatibles. The on board high speed 8051 uC provides USB functions run at 12Mbps full speed or 1.5Mbps low speed.

The USB industry control board can be connected to computer by using USB or RS232, RS422/RS485 communication links.

❖ **The features of USB industry control board are:**

- USB 2.0with Plug and Play (PnP) features.
- High speed 8051 uC core.
- Support USB ID selection to identify USB device.
- Support 8 ports 8 digital input/output channels, total 64 digital input/output channels.
- Support extra 8 digital input/output channels, which are direct driven by 8051 chip.
- Allows to connect DECISION industry products: 8 channel relay output/photo isolator input board, 8 channel SSR relay output/photo isolator input board, 16



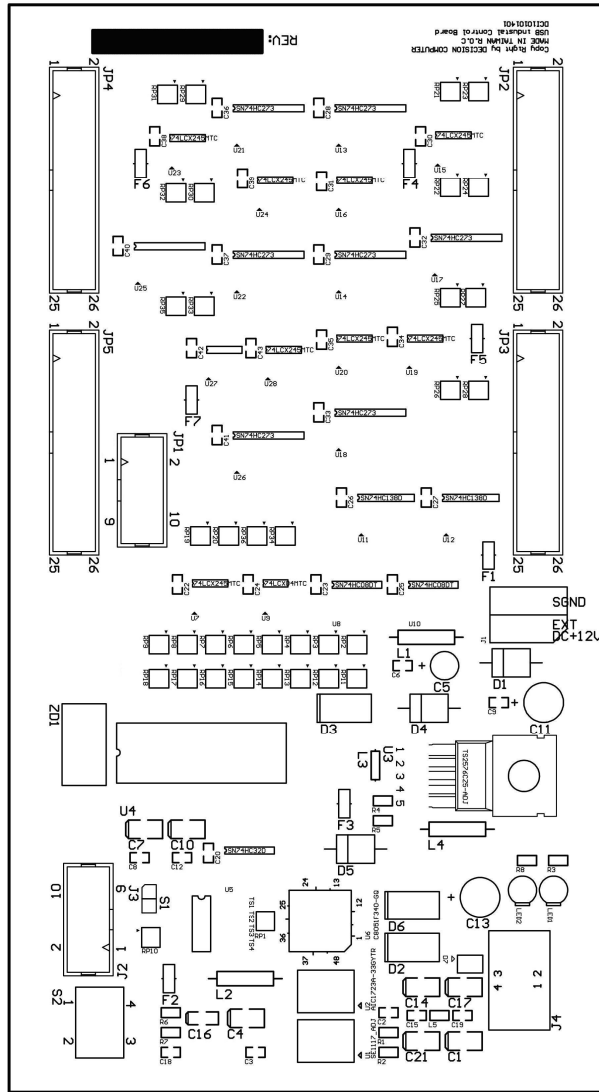
channel relay output board, 16 channel photo isolator input board, and industrial DIN rail mountable terminal block adapter.

- Allow to connect RS232 or RS422/RS485 extension board with DB9 connector.
- Power supplied from external DC +12V/1.5A.
- Each digital I/O voltage range from 0V to 3.5V.
  - 0 to 0.4V inactive
  - 2.8 to 3.4V active
- Suitable for Linux, MS/WINDOWS, ... etc.
- Operating temperature range from 0 to 33C.
- Relative humidity rage from 0 to 90%.

❖ **PACKAGE CONTENTS:**

- USB industry control board.
- USB cable.
- Optional extension board with DB9 connector, select one of the following:
  1. RS232 KIT DCI09031800\_A
  2. RS422/485 KIT DCI09031800\_B
- User's manual.
- Decision Studio CD for USB LAB KITS software.
- Warranty form.





## CHAPTER 2 HARDWARE CONFIGURATION

Before you use the USB industry control board, please ensure that the jumpers and switches setting. The proper jumper and switches settings for the USB industry control board are described in the following.

### 2.1 Switch Settings

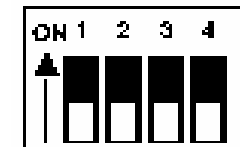
1. S1 Reset



The S1 switch is used to reset 8051, the signal assignments are shown in the following.

Pin	Signals
3,4	Reset SW+
1,2	Reset SW-

2. S2 USB ID



The S2 switch is used to identify USB card ID. Please set different card ID to each card (do not duplicate card ID setting).



1	2	3	4	Card ID
ON	ON	ON	ON	--
OFF	ON	ON	ON	14
ON	OFF	ON	ON	13
OFF	OFF	ON	ON	12
ON	ON	OFF	ON	11
OFF	ON	OFF	ON	10
ON	OFF	OFF	ON	9
OFF	OFF	OFF	ON	8
ON	ON	ON	OFF	7
OFF	ON	ON	OFF	6
ON	OFF	ON	OFF	5
OFF	OFF	ON	OFF	4
ON	ON	OFF	OFF	3
OFF	ON	OFF	OFF	2
ON	OFF	OFF	OFF	1
OFF	OFF	OFF	OFF	0

3. Down load revised firmware

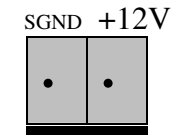
When the S2 switch is set to ON ON ON ON status, means down load revised firmware. please follow the steps shown in the following:

1. Set S2 to ON ON ON ON.
2. Run USBBootloader program to down load revised firmware.



2.2 Jumper Settings

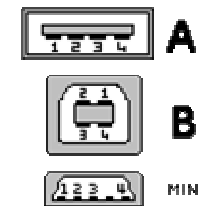
1. External Power Input (J1)



The power of USB industry control board can be supplied from USB, however, if USB can not supply enough power, the external power is need. To input external power, please use the pin 1 and pin 2 connectors of J1. Be careful to input DC +12V power.

2.3 USB Connector

1. USB Connector



The USB connector is connected to computer USB port by using USB cable.

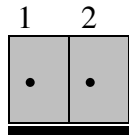
2.4 Connector and Jumper for Serial Communication

1. The connctor of serial communication(J2)  
To use RS422/RS485/RS232, please connect J2 to extension board by 10 pins flat cable.





2. Enable Serial Port (J3)



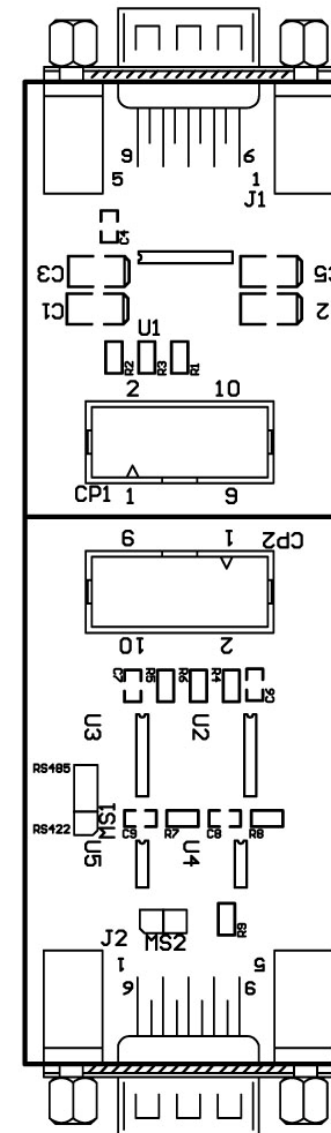
J3 is used enable serial port communication, when short the J3, means enable serial port, otherwise, when open the J3, the serial port communication is disable.

**2.5 Extension Board for Serial Communication**

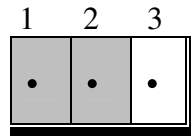
Extension boards with DB9 connector for RS232 or RS422/RS485 are optional products, user can connect USB industry control board to computer by using serial communication. Please follow the steps in belows:

1. By using 10 pins flat cable to connect J2 of USB industry control board and CP1(RS232)/CP2(RS422/RS485) on the extension board.
2. Connect J1(RS232)/J2(TS422/RS485) of extension board to computer RS232 or RS422/RS485 port.

The diagram of these extension boards are shown in the following:



1. RS422/RS485 Selection (MS1)



The MS1 is located at RS422/RS485 extension board. MS1 is used to set RS422/RS485 communication, when short pin 1 and pin 2, means set RS422. When short pin 2 and pin 3, means set RS485.

2. Long Distance Communication (MS2)

The MS2 is located at RS422/RS485 extension board. MS2 is used to set long distance communication, when short the MS2, means long distance communication. Otherwise, open the MS2, means normal distance communication.

**2.6 Connector Assignments**

The input/output signals of USB industry control board are assigned in the JP2 to JP5 connector and an extra DIO port JP1 connector, its pin assignments are show in the below.

JP1

Pin	Signal	Description
1	DIO0	Port DIO/Line 0
2	DIO1	Port DIO/Line 1
3	DIO2	Port DIO/Line 2
4	DIO3	Port DIO/Line 3
5	DIO4	Port DIO/Line 4
6	DIO5	Port DIO/Line 5
7	DIO6	Port DIO/Line 6
8	DIO7	Port DIO/Line 7
9	SGND	Signal Ground
10	SGND	Signal Ground



JP2

Pin	Signal	Description
1	+12V	Internal DC +12V Power
2	SGND	Signal Ground
3	+12V	Internal DC +12V Power
4	SGND	Signal Ground
5	P0D00	Port 0/Line 0
6	P0D01	Port 0/Line 1
7	P0D02	Port 0/Line 2
8	P0D03	Port 0/Line 3
9	P0D04	Port 0/Line 4
10	P0D05	Port 0/Line 5
11	P0D06	Port 0/Line 6
12	P0D07	Port 0/Line 7
13	P1D00	Port 1/Line 0
14	P1D01	Port 1/Line 1
15	P1D02	Port 1/Line 2
16	P1D03	Port 1/Line 3
17	P1D04	Port 1/Line 4
18	P1D05	Port 1/Line 5
19	P1D06	Port 1/Line 6
20	P1D07	Port 1/Line 7
21	SGND	Signal Ground
22	SGND	Signal Ground
23	+5V	+5V Power
24	SGND	Signal Ground
25	-12V	Internal DC -12V Power
26	SGND	Signal Ground



JP3

Pin	Signal	Description
1	+12V	Internal DC +12V Power
2	SGND	Signal Ground
3	+12V	Internal DC +12V Power
4	SGND	Signal Ground
5	P2D00	Port 2/Line 0
6	P2D01	Port 2/Line 1
7	P2D02	Port 2/Line 2
8	P2D03	Port 2/Line 3
9	P2D04	Port 2/Line 4
10	P2D05	Port 2/Line 5
11	P2D06	Port 2/Line 6
12	P2D07	Port 2/Line 7
13	P3D00	Port 3/Line 0
14	P3D01	Port 3/Line 1
15	P3D02	Port 3/Line 2
16	P3D03	Port 3/Line 3
17	P3D04	Port 3/Line 4
18	P3D05	Port 3/Line 5
19	P3D06	Port 3/Line 6
20	P3D07	Port 3/Line 7
21	SGND	Signal Ground
22	SGND	Signal Ground
23	+5V	+5V Power
24	SGND	Signal Ground
25	-12V	Internal DC -12V Power
26	SGND	Signal Ground

JP4

Pin	Signal	Description
1	+12V	Internal DC +12V Power
2	SGND	Signal Ground
3	+12V	Internal DC +12V Power
4	SGND	Signal Ground
5	P4D00	Port 4/Line 0
6	P4D01	Port 4/Line 1
7	P4D02	Port 4/Line 2
8	P4D03	Port 4/Line 3
9	P4D04	Port 4/Line 4
10	P4D05	Port 4/Line 5
11	P4D06	Port 4/Line 6
12	P4D07	Port 4/Line 7
13	P5D00	Port 5/Line 0
14	P5D01	Port 5/Line 1
15	P5D02	Port 5/Line 2
16	P5D03	Port 5/Line 3
17	P5D04	Port 5/Line 4
18	P5D05	Port 5/Line 5
19	P5D06	Port 5/Line 6
20	P5D07	Port 5/Line 7
21	SGND	Signal Ground
22	SGND	Signal Ground
23	+5V	+5V Power
24	SGND	Signal Ground
25	-12V	Internal DC -12V Power
26	SGND	Signal Ground

JP5

Pin	Signal	Description
1	+12V	Internal DC +12V Power
2	SGND	Signal Ground
3	+12V	Internal DC +12V Power
4	SGND	Signal Ground
5	P6D00	Port 6/Line 0
6	P6D01	Port 6/Line 1
7	P6D02	Port 6/Line 2
8	P6D03	Port 6/Line 3
9	P6D04	Port 6/Line 4
10	P6D05	Port 6/Line 5
11	P6D06	Port 6/Line 6
12	P6D07	Port 6/Line 7
13	P7D00	Port 7/Line 0
14	P7D01	Port 7/Line 1
15	P7D02	Port 7/Line 2
16	P7D03	Port 7/Line 3
17	P7D04	Port 7/Line 4
18	P7D05	Port 7/Line 5
19	P7D06	Port 7/Line 6
20	P7D07	Port 7/Line 7
21	SGND	Signal Ground
22	SGND	Signal Ground
23	+5V	+5V Power
24	SGND	Signal Ground
25	-12V	Internal DC -12V Power
26	SGND	Signal Ground





## CHAPTER 3

### WINDOWS/XP CONFIGURATION

The USB industry control board can be install to Windows/XP via USB plug and play function, please follow the steps shown in the following:.

1. For optimum PnP functionality, please install one board at a time.
2. Windows/XP will detect the new USB industry control board that is installed in your computer, and will prompt you for a proper driver.
3. Install Virtual COM port (VCP) drivers which is in Drivers \ Virtual COM \ Vertual\_COM.inf.. Virtual COM port (VCP) drivers cause the USB device to appear as an additional COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port.
4. After Windows/XP has detected and configured all ports, you may begin using the USB industry control board. To verify that the installation process completed successfully, please proceed into the Control Panel / System / Device Manager.
5. Locate the additional COM ports in the ports section, and Digital I/O and analog to digital device from HID device..



## CHAPTER 4

### SOFTWARE PROGRAMMING UNDER

### WINDOWS/XP AND LINUX

The LABKIT\_host is a diagnostic program to test your USB industry control board under Windows/XP. User can get LABKIT\_host programs from Decision Studio CD.

The USB industry control board can be installed in the Linux by using serial device driver supported by Linux. For more details, please refer to 'setserial' man-pages. After the Linux recognizes the serial port, it will assign device name as /dev/ttyACM0 for the first serial port, and /dev/ttyACM1 for the second serial port, ...etc.

To input/output data from USB industry control board, please use Hid API functions. User can get Hid API functions from Decision Studio package.



## APPENDIX A

### WARRANTY INFORMATION

#### A.1 Copyright

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#### A.2 Warranty Information

SmartLab warrants that for a period of one year from the date of purchase (unless otherwise specified in the warranty card) that the goods supplied will perform according to the specifications defined in the user manual. Furthermore that the SmartLab product will be supplied free from defects in



materials and workmanship and be fully functional under normal usage.

In the event of the failure of a SmartLab product within the specified warranty period, SmartLab will, at its option, replace or repair the item at no additional charge. This limited warranty does not cover damage resulting from incorrect use, electrical interference, accident, or modification of the product.

All goods returned for warranty repair must have the serial number intact. Goods without serial numbers attached will not be covered by the warranty.

The purchaser must pay transportation costs for goods returned. Repaired goods will be dispatched at the expense of SmartLab.

To ensure that your SmartLab product is covered by the warranty provisions, it is necessary that you return the Warranty card.

Under this Limited Warranty, SmartLab's obligations will be limited to repair or replacement only, of goods found to be defective a specified above during the warranty period. SmartLab is not liable to the purchaser for any damages or losses of any kind, through the use of, or inability to use, the SmartLab product.

SmartLab reserves the right to determine what constitutes warranty repair or replacement.

Return Authorization: It is necessary that any returned goods are clearly marked with an RA number that has been issued by



SmartLab. Goods returned without this authorization will not be attended to.

