SMARTLAB
USB 8255/8254 CARD

OPERATION MANUAL

Decision Computer Int'l. Co., Ltd.

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CHAPTER 1
INTRODUCTION

The USB 8255/8254 card is a programmable interface for PC/386, PC/486, Pentium or compatible computers. The interface contains 8254 chip and 8255 chip, the 8254 chip provides programmable interval timer/counter functions and the 8255 chips provide programmable input/output functions.

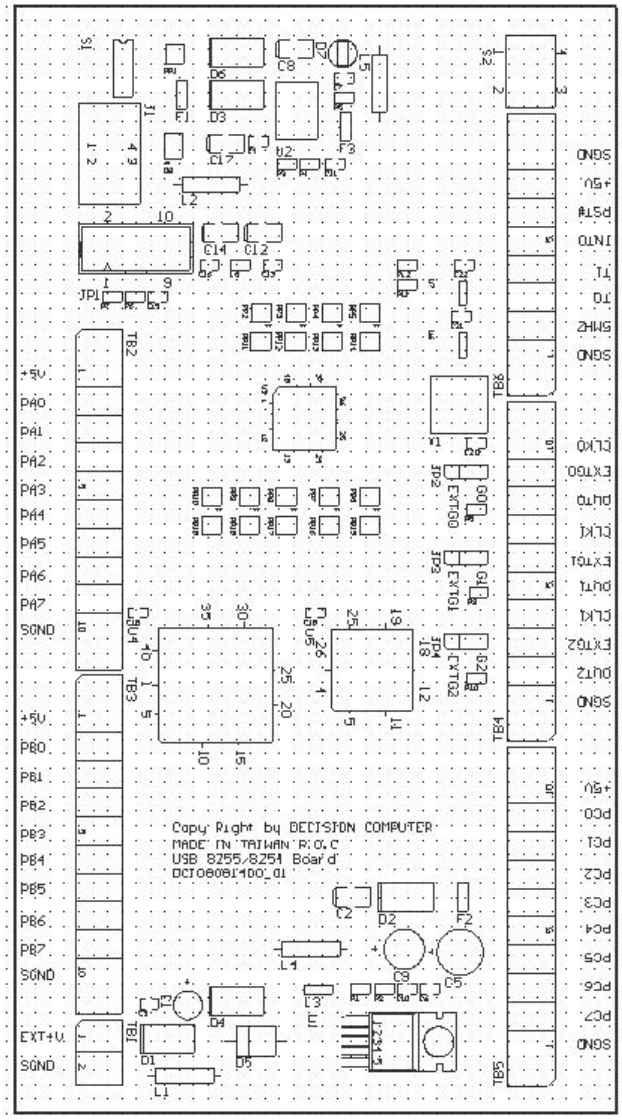
❖ The features of USB 8255/8254 card are:

- USB2.0 with Plug and Play (PnP) features.
- High speed 8051 uC core.
- Support USB ID selection to identify USB device.
- Power supplied from external DC +12V 2A adaptor.
- Programmable I/O control functions.
- Up to 24 I/O lines.
- Three independent 16 bits counter/timer.
- Maximum of 10 MHZ counter rate.
- Support several operating modes which are programmable.
- Operating temperature range from 0 to 55C.
- Relative humidity rage from 0 to 90%.
- Board size is 195.58 mm x 106.68 mm x 18 mm.

❖ PACKAGE CONTENTS:

- SMARTLAB USB 8255/8254 card.
- USB cable.
- User's manual.
- Decision Studio CD for USB 8255/8254 software.
- Warranty form.

DECISION Computer International Ltd.,

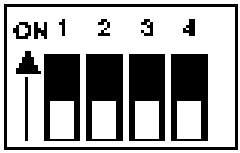


CHAPTER 2
HARDWARE CONFIGURATION

Before you use the USB 8255/8254 card, please ensure that the jumpers and switches setting. The proper jumper and switches settings for the USB 8255/8254 card are described in the following.

2.1 Switch Settings

1. S1 USB ID



The S1 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

When the S1 switch is set to ON ON ON ON status, means down load revised firmware. Please follow the steps shown in the following:
1. Set S1 to ON ON ON ON.
2. Run USBBootloader program to down load revised firmware.

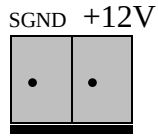
2. S2 Reset

The S2 switch is used to reset 8051, the signal assignments are shown in the following.

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

2.2 External Power Adapter Settings

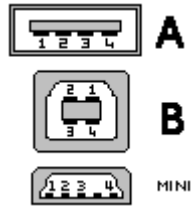
1. External Power Input (TB1)



The power of USB 8255/8254 card must be supplied from external DC +12V power adapter, user need connect TB1 to power adapter. 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 Assignments

1. **8255 Signal Assignments**

The signal assignments of 8255 are shown in the following.

TB2

Pin	Signal	Description
1	+5V	DC +5V
2	PA0	8255 Port A Bit 0
3	PA1	8255 Port A Bit 1
4	PA2	8255 Port A Bit 2
5	PA3	8255 Port A Bit 3
6	PA4	8255 Port A Bit 4
7	PA5	8255 Port A Bit 5
8	PA6	8255 Port A Bit 6
9	PA7	8255 Port A Bit 7
10	SGND	Signal Ground

TB3

Pin	Signal	Description
1	+5V	DC +5V
2	PB0	8255 Port B Bit 0
3	PB1	8255 Port B Bit 1
4	PB2	8255 Port B Bit 2
5	PB3	8255 Port B Bit 3
6	PB4	8255 Port B Bit 4
7	PB5	8255 Port B Bit 5
8	PB6	8255 Port B Bit 6
9	PB7	8255 Port B Bit 7
10	SGND	Signal Ground

TB5

Pin	Signal	Description
1	SGND	Signal Ground
2	PC7	8255 Port C Bit 7
3	PC6	8255 Port C Bit 6
4	PC5	8255 Port C Bit 5
5	PC4	8255 Port C Bit 4
6	PC3	8255 Port C Bit 3
7	PC2	8255 Port C Bit 2
8	PC1	8255 Port C Bit 1
9	PC0	8255 Port C Bit 0
10	+5V	DC +5V

2. 8254 Signal Assignments

The signal assignments of 8254 are shown in the following. TB4 is the signal assignment of 8254, and the TB6 is the test signal of 8254.

TB4

Pin	Signal	Description
1	SGND	Signal Ground
2	OUT2	8254 Port 2 Output
3	EXTG2	8254 Port 2 GATE2
4	CLK2	8254 Port 2 CLK
5	OUT1	8254 Port 1 Output
6	EXTG1	8254 Port 1 GATE1
7	CLK1	8254 Port 1 CLK
8	OUT0	8254 Port 0 Output
9	EXTG0	8254 Port 0 GATE0
10	CLK0	8254 Port 0 CLK

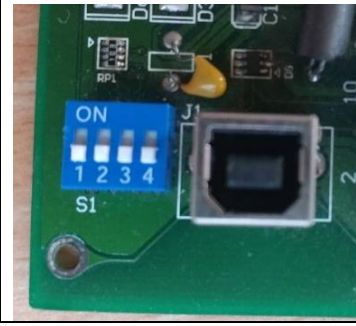
CHAPTER 3

SOFTWARE PROGRAMMING UNDER WINDOWS/XP AND LINUX

To programming USB 8255/8254 ports, please use Hid API functions. User can get Hid API functions from Decision Studio package. The useable DLL version is USBDII.dll V 2.0.1.9 or above.

The API functions are defined in the following:

1. Open

<table>
<tr><td>Command</td><td>hDevice = hid_OpenDevice(int DevType, int DevId)</td></tr>
<tr><td>Parameters</td><td>DevType:
<table>
<tr><td>Type</td><td>Description</td></tr>
<tr><td>15</td><td>USB 8255 protocols</td></tr>
</table>
DevId:
<table>
<tr><td>Type</td><td>Comment</td></tr>
<tr><td>0~14</td><td>USB ID
 
</td></tr>
</table></td></tr>
<tr><td>Return Values</td><td>Returns a resource on success, or FALSE on error.</td></tr>
<tr><td>Example</td><td>hDevice = hid_OpenDevice(0xF , 0)</td></tr>
</table>

2. Close

Command	lResult = hid_CloseDevice (int hDevice)
Parameters	hDevice: A valid resource created with hid_OpenDevice
Return Values	Returns a TRUE on success, or FALSE on error.
Example	lResult = hid_CloseDevice (hDevice)

3. I/O Control (Set and Output)

<table>
<tr><td>Command</td><td>lResult = hid_SetDigitalByte(int hDevice,int address, int Data)</td></tr>
<tr><td>Parameters</td><td>hDevice:
A valid resource created with hid_OpenDevice

address:
The address is only 0~9.
<table>
<tr><td>Value</td><td>Comment</td></tr>
<tr><td>0</td><td>Output Control 8255 IC PA port (Data)</td></tr>
<tr><td>1</td><td>Output Control 8255 IC PB port (Data)</td></tr>
<tr><td>2</td><td>Output Control 8255 IC PC port (Data)</td></tr>
<tr><td>3</td><td>Set 8255 IC input or output
Note:
<table>
<tr><td>Data bit</td><td>comment</td></tr>
<tr><td>Bit 0</td><td>Bit0 = 1 is PA Output
Bit0 = 0 is PA Input</td></tr>
<tr><td>Bit 1</td><td>Bit1= 1 is PB Output
Bit1 = 0 is PB Input</td></tr>
<tr><td>Bit 2</td><td>Bit2 = 1 is PC Output
Bit2= 0 is PC Input</td></tr>
</table></td></tr>
<tr><td>4</td><td>Set 8254 IC counter 0 low 8 bit (Data)</td></tr>
<tr><td>5</td><td>Set 8254 IC counter 1 low 8 bit (Data)</td></tr>
<tr><td>6</td><td>Set 8254 IC counter 2 low 8 bit (Data)</td></tr>
<tr><td>7</td><td>Set 8254 IC counter 0 Hight 8 bit (Data)</td></tr>
<tr><td>8</td><td>Set 8254 IC counter 2 Hight 8 bit (Data)</td></tr>
<tr><td>9</td><td>Set 8254 IC counter 3 Hight 8 bit (Data)</td></tr>
</table>
Data range from 0~0xFF, Data will follow address comment</td></tr>
</table>

Return Values	Returns a TRUE on success, or FALSE on error.

Example 8255	hid_SetDigitalByte(hDevice, 3 , 7) //set PA,PB,PC Output
	hid_SetDigitalByte(hDevice, 1 , 0xFF) //set PB Output 0XFF

Example 8254	hid_SetDigitalByte(hDevice, 4 , 0x00) hid_SetDigitalByte(hDevice, 7 , 0xFF) //set counter 0 = 0XFF00

4. I/O Control (Set and Input)

<table>
<tr><td>Command</td><td>lResult = hid_GetDigitalByte(int hDevice,int address, int &inData)</td></tr>
<tr><td>Parameters</td><td>hDevice:
A valid resource created with hid_OpenDevice

address:
The address is only 0~3.
<table>
<tr><td>Value</td><td>Comment</td></tr>
<tr><td>0</td><td>Get 8255 IC PA port Value (Data)</td></tr>
<tr><td>1</td><td>Get 8255 IC PB port Value (Data)</td></tr>
<tr><td>2</td><td>Get 8255 IC PC port Value (Data)</td></tr>
<tr><td>3</td><td>Get 8255 IC input or output
Note:
<table>
<tr><td>Data bit</td><td>comment</td></tr>
<tr><td>Bit 0</td><td>Bit0 = 1 is PA Output
Bit0 = 0 is PA Input</td></tr>
<tr><td>Bit 1</td><td>Bit1 = 1 is PB Output
Bit1 = 0 is PB Input</td></tr>
<tr><td>Bit 2</td><td>Bit2 = 1 is PC Output
Bit2 = 0 is PC Input</td></tr>
</table></td></tr>
</table>
Data range from 0~0xFF, Data will follow address comment, Data is Call by reference</td></tr>
<tr><td>Return Values</td><td>Returns a TRUE on success, or FALSE on error.</td></tr>
<tr><td>Example 8255</td><td>hid_SetDigitalByte(hDevice, 3 , 0) //set PA,PB,PC Input
hid_ hid_GetDigitalByte (hDevice, 2 , inData) //get PC Value</td></tr>
</table>

APPENDIX A
WARRANTY INFORMATION

A.1 Copyright

Each piece of SmartLab package permits user to use SmartLab only on a single computer, a registered user may use he program on a different computer, but may not use the program on more than one computer at the same time.

Corporate licensing agreements allow duplication and distribution of specific number of copies within the licensed institution. Duplication of multiple copies is not allowed except through execution of a licensing agreement. Welcome call for details.

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.

APPENDIX B

DATA SHEET