PCI BUS MULTIPLE 8255/8254 ADAPTER

OPERATION MANUAL

Update 02/04

DECISION

Computer International Co., Ltd.

TABLE OF CONTENTS

CHAPTERS

APPENDICES

CHAPTER 1
INTRODUCTION

The PCI bus multi-8255/8254 adapter is a 32 bits PCI bus adapter with Plug and Play (PnP) features, it is a programmable I/O interface for PC/486, Pentium or compatible computers. The PnP features let hardware configuration for IRQ and I/O address is detected by BIOS automatically, you don't need set switch and jumper.

The PCI bus multi-8255/8254 adapter provides total 24 digital I/O ports, each I/O port contains 8 I/O lines, and can be set either input or output by the user's program. Two 8254 on board chips provides six programmable interval timer/counter.

The features of the PCI bus multi-8255/8254 adapter are:

- 32 bits PCI bus with Plug and Play (PnP) features.
- Programmable I/O control functions.
- Up to 192 I/O lines.
- Up to 6 counter/timer.
- Maximum of 10 MHZ counter rate.
- Support several operating modes that are programmable.
- Provides DII device driver for PnP features.

CHAPTER 2
UNPACKING INFORMATION

Check that your PCI bus multi-8255/8254 package includes the following items:

- PCI bus multi-8255/8254 adapter.
- Demo Program.
- Data Capture Software Manual with CD.
- Four expansion flat cables with IDC50/DB50 connector.
- One expansion flat cables with DB37/IDC40 connector.
- DII device driver.
- User manual.
- Warranty form.

CHAPTER 3
HARDWARE INSTALLATION

Your PCI bus multi-8255/8254 adapter is designed to be inserted in any available PCI slot in your PC/486, Pentium or compatibles. In order to gain access to the expansion slots, follow the steps listed below:

1. Turn off all power to your computer and all peripheral devices before installing your multi-8255/8254 adapter.
2. Remove the cover of the computer.
3. Insert the multi-8255/8254 adapter into any available PCI slot. Make sure the adapter is firmly seated in the chosen slot.
4. Replace the cover of the computer.
5. Connects the expansion cables.
6. Turn on the power of your computer, the PnP features will recognize the multi-8255/8254 adapter.

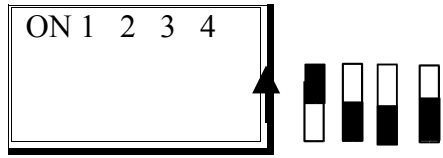
CHAPTER 4
HARDWARE CONFIGURATION

4.1 I/O Port Address

Base + 0 : Port 1A input/output buffer.
Base + 1 : Port 1B input/output buffer.
Base + 2 : Port 1C input/output buffer.
Base + 3 : Port 1 control register.
Base + 4 : Port 2A input/output buffer.
Base + 5 : Port 2B input/output buffer.
Base + 6 : Port 2C input/output buffer.
Base + 7 : Port 2 control register.
Base + 8 : Port 3A input/output buffer.
Base + 9 : Port 3B input/output buffer.
Base + 10 : Port 3C input/output buffer.
Base + 11 : Port 3 control register.
Base + 12 : Port 4A input/output buffer.
Base + 13 : Port 4B input/output buffer.
Base + 14 : Port 4C input/output buffer.
Base + 15 : Port 4 control register.
Base + 16 : Port 5A input/output buffer.
Base + 17 : Port 5B input/output buffer.
Base + 18 : Port 5C input/output buffer.
Base + 19 : Port 5 control register.
Base + 20 : Port 6A input/output buffer.
Base + 21 : Port 6B input/output buffer.
Base + 22 : Port 6C input/output buffer.
Base + 23 : Port 6 control register.
Base + 24 : Port 7A input/output buffer.
Base + 25 : Port 7B input/output buffer.

Base + 26 : Port 7C input/output buffer.
Base + 27 : Port 7 control register.
Base + 28 : Port 8A input/output buffer.
Base + 29 : Port 8B input/output buffer.
Base + 30 : Port 8C input/output buffer.
Base + 31 : Port 8 control register.
Base + 32 : Counter 0 input/output buffer.
Base + 33 : Counter 1 input/output buffer.
Base + 34 : Counter 2 input/output buffer.
Base + 35 : Counter control register for counter 0,1,2.
Base + 36 : Counter 3 input/output buffer.
Base + 37 : Counter 4 input/output buffer.
Base + 38 : Counter 5 input/output buffer.
Base + 39 : Counter control register for counter 3,4,5.

4.2 DIP Switch



The switch is used to identify card number, default setting is card 1. There are two methods to set the card number:

a. PnP mode
Just plug in PCI bus adapter into PCI slot, the PCI BIOS will allocate I/O address to each adapter automatically and assign card number start from 0 to each adapter. However, if you plug in more than one adapter, please set whole adapters to card number 1 (default setting), then use software tools to distinguish port id.

b. manual mode

Set card number by card identifier switch, the PCI BIOS will assign pre-allocated I/O address to each adapter. Please set different card number to each adapter (do not duplicate card number setting).

1	2	3	4	Card Number
ON	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	2
ON	ON	OFF	OFF	3
OFF	OFF	ON	OFF	4

☞ The card number starts from 0 to 15.

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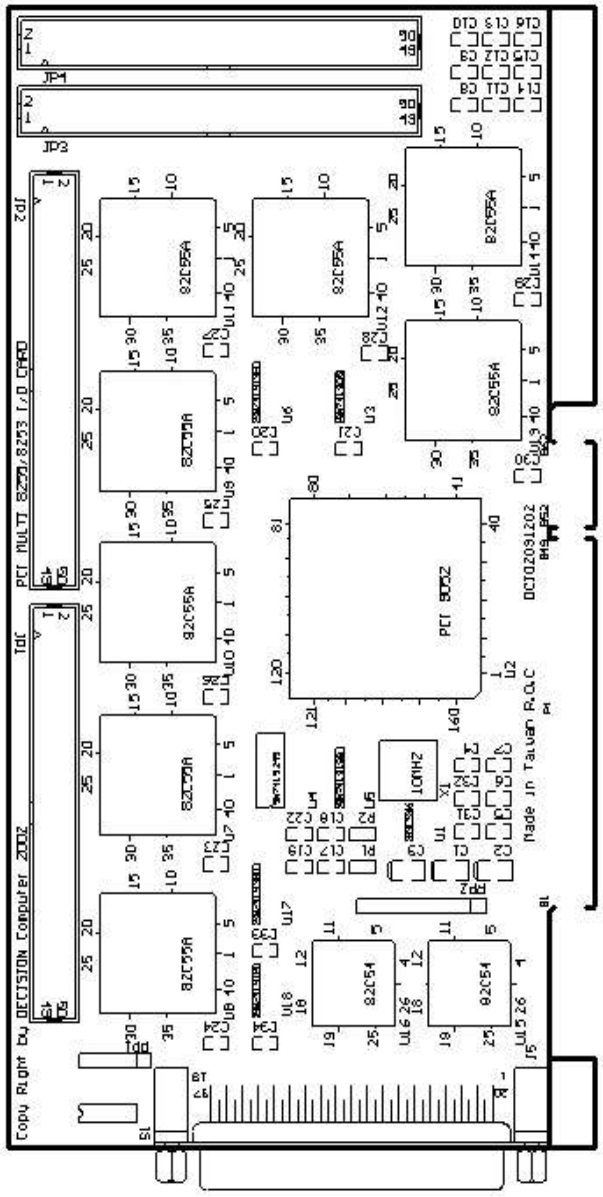

4.3 Pin Assignments

The signals assignment are shown in the following, where **A** is the signals assignment of DB50 connector on the flat cable, and the signals assignment of on board connector, and **DB** is the signals assignment of university connector of Sub-D50.

When you like to connect Sub-D50 connector to DB50 connector, please use **DB**. The pin to pin assigned is shown as **DB** vs. **A**.

Sample:

DB	A	Function		DB	A	Functio
1	1	P3A0		34	2	P3A1
18	3	P3A2		2	4	P3A3

For the DB37 connector, the pin assignments of 40 pin flat cable is mark as A.

The pin assignments are shown in the next pages.

1. **Connector Pin Assignments (JP1) U1/U2**

DB	A	Functio		DB	A	Functio
1	1	P1A0		34	2	P1A1
18	3	P1A2		2	4	P1A3
35	5	P1A4		19	6	P1A5
3	7	P1A6		36	8	P1A7
20	9	P1B0		4	10	P1B1
37	11	P1B2		21	12	P1B3
5	13	P1B4		38	14	P1B5
22	15	P1B6		6	16	P1B7
39	17	P1C0		23	18	P1C1
7	19	P1C2		40	20	P1C3
24	21	P1C4		8	22	P1C5
41	23	P1C6		25	24	P1C7
9	25	GND		42	26	GND
26	27	P2A0		10	28	P2A1
43	29	P2A2		27	30	P2A3
11	31	P2A4		44	32	P2A5
28	33	P2A6		12	34	P2A7
45	35	P2B0		29	36	P2B1
13	37	P2B2		4	38	P2B3
30	39	P2B4		14	40	P2B5
47	41	P2B6		31	42	P2B7
15	43	P2C0		48	44	P2C1
32	45	P2C2		16	46	P2C3
49	47	P2C4		33	48	P2C5

17	49	P2C6		50	50	P2C7

2. **Connector Pin Assignments (JP2) U3/U4**

DB	A	Functio		DB	A	Functio
1	1	P3A0		34	2	P3A1
18	3	P3A2		2	4	P3A3
35	5	P3A4		19	6	P3A5
3	7	P3A6		36	8	P3A7
20	9	P3B0		4	10	P3B1
37	11	P3B2		21	12	P3B3
5	13	P3B4		38	14	P3B5
22	15	P3B6		6	16	P3B7
39	17	P3C0		23	18	P3C1
7	19	P3C2		40	20	P3C3
24	21	P3C4		8	22	P3C5
41	23	P3C6		25	24	P3C7
9	25	GND		42	26	GND
26	27	P4A0		10	28	P4A1
43	29	P4A2		27	30	P4A3
11	31	P4A4		44	32	P4A5
28	33	P4A6		12	34	P4A7
45	35	P4B0		29	36	P4B1
13	37	P4B2		46	38	P4B3
30	39	P4B4		14	40	P4B5
47	41	P4B6		31	42	P4B7
15	43	P4C0		48	44	P4C1
32	45	P4C2		16	46	P4C3

49	47	P4C4		33	48	P4C5
17	49	P4C6		50	50	P4C7

Connector Pin Assignments (JP3) U5/U6

DB	A	Function		DB	A	Functio
1	1	P5A0		34	2	P5A1
18	3	P5A2		2	4	P5A3
35	5	P5A4		19	6	P5A5
3	7	P5A6		36	8	P5A7
20	9	P5B0		4	10	P5B1
37	11	P5B2		21	12	P5B3
5	13	P5B4		38	14	P5B5
22	15	P5B6		6	16	P5B7
39	17	P5C0		23	18	P5C1
7	19	P5C2		40	20	P5C3
24	21	P5C4		8	22	P5C5
41	23	P5C6		25	24	P5C7
9	25	GND		42	26	GND
26	27	P6A0		10	28	P6A1
43	29	P6A2		27	30	P6A3
11	31	P6A4		44	32	P6A5
28	33	P6A6		12	34	P6A7
45	35	P6B0		29	36	P6B1
13	37	P6B2		46	38	P6B3
30	39	P6B4		14	40	P6B5
47	41	P6B6		31	42	P6B7
15	43	P6C0		48	44	P6C1
32	45	P6C2		16	46	P6C3
49	47	P6C4		33	48	P6C5

17	49	P6C6		50	50	P6C7

3. **Connector Pin Assignments (JP4) U7/U8**

DB	A	Functio		DB	A	Functio
1	1	P7A0		34	2	P7A1
18	3	P7A2		2	4	P7A3
35	5	P7A4		19	6	P7A5
3	7	P7A6		36	8	P7A7
20	9	P7B0		4	10	P7B1
37	11	P7B2		21	12	P7B3
5	13	P7B4		38	14	P7B5
22	15	P7B6		6	16	P7B7
39	17	P7C0		23	18	P7C1
7	19	P7C2		40	20	P7C3
24	21	P7C4		8	22	P7C5
41	23	P7C6		25	24	P7C7
9	25	GND		42	26	GND
26	27	P8A0		10	28	P8A1
43	29	P8A2		27	30	P8A3
11	31	P8A4		44	32	P8A5
28	33	P8A6		12	34	P8A7
45	35	P8B0		29	36	P8B1
13	37	P8B2		46	38	P8B3
30	39	P8B4		14	40	P8B5
47	41	P8B6		31	42	P8B7
15	43	P8C0		48	44	P8C1
32	45	P8C2		16	46	P8C3
49	47	P8C4		33	48	P8C5

17	49	P8C6		50	50	P8C7

Connector Pin Assignments (DB37) U16/U17

DB	A	Functio		DB	A	Functio
1	1			21	4	
2	3	OUT0		22	6	OUT5
3	5	GATE0		23	8	GATE5
4	7	CLK0		24	10	CLK5
5	9			25	12	
6	11	OUT1		26	14	+5V
7	13	GATE1		27	16	
8	15	CLK1		28	18	-12V
9	17			29	20	
10	19	OUT2		30	22	+12V
11	21	GATE2		31	24	
12	23	CLK2		32	26	-12V
13	25			33	28	5MHZ
14	27	OUT3		34	30	1MHZ
15	29	GATE3		35	32	500KHZ
16	31	CLK3		36	34	100KHZ
17	33			37	36	
18	35	OUT4				
19	37	GATE4				
20	2	CLK4				

CHAPTER 5
DII DEVICE DRIVER

To install DII (Decision Industrial Interface) for Windows 95 and Windows NT, you may start the installation by running SETUP.EXE supplied on this distribution CD. During installation, the Setup application will install an icon into a new program group in your start menu (default name: "Decision Industrial Interface"). After DII is installed, please select “Start” menu, then “Settings”, then “Control Panel”, then “Add New Hardware” menu, then select PCI multi-8255 card on the “Industrial I/O Devices” hardware group.

The DII provides DLL, OCX, ... etc. components for further programming. For more details, please refer DII manual.

CHAPTER 6
DIAGNOSTIC

In the following, we assume PCI BIOS allocates I/O address is 1B0.

6.1 PASCAL Programming

```
program diagnostic(input, output);
uses   Crt;
var   a, i, test : integer;
procedure subtest;
begin
     for i := 0 to 2 do
          port[test+i] := a;
end;
begin
     { 8255 I/O Card Testing Program }
     clrscr;
     gotoxy(10, 10);
     writeln('8255  I/O  CARD TESTING');
     gotoxy(10, 12);
       writeln('TWO  8255  PORT  A,B,C  OUTPUT  SQUARE
WAVE');
     gotoxy(10, 14);
     writeln('8253  COUNTER  0  DIVIDE BY 2');
     gotoxy(10, 16);
     writeln('      COUNTER  1  DIVIDE BY 50');
     gotoxy(10, 18);
```

```
    writeln('     COUNTER  2  DIVIDE BY 100');
    { 8253 Testing }
    test := $1B0;
    port[test+11] := $36;
    port[test+11] := $76;
    port[test+11] := $B6;
    port[test+ 8] := $02;     port[test+ 8] := $0;
    port[test+ 9] := $32;     port[test+ 9] := $0;
    port[test+10] := $64;     port[test+10] := $0;
    repeat
        test := $1B0;
        port[test+3] := $80;
        a := 0;       subtest;
        for i := 0 to 1000 do;
        a := $ff;     subtest;
        test := test + 4;
        port[test+3] := $80;
        a := 0;       subtest;
        for i := 0 to 1000 do;
        a := $ff;      subtest
    until keypressed;
end.
```

6.2 C Programming

```
#include <stdio.h>
#include <conio.h>
int test,i,a;
void subtest()
{
   for(i=0;i<=2;i++) outportb(test+i,a);
}
main()
{
   clrscr();
   gotoxy(10,10);
   puts("8255  I/O  CARD TESTING");
   gotoxy(10,12);
   puts("TWO 8255 PORT A,B,C OUTPUT SQUARE WAVE");
   gotoxy(10,14);
   puts("8253 COUNTER   0 DIVIDE BY 2");
   gotoxy(10,16);
   puts("8253 COUNTER   1 DIVIDE BY 50");
   gotoxy(10,18);
   puts("8253 COUNTER   2 DIVIDE BY 100");

   test = 0x1b0;
   outportb(test+11,0x36);
   outportb(test+11,0x76);
   outportb(test+11,0xb6);
   outportb(test+ 8,0x02);
   outportb(test+ 8,0x00);
   outportb(test+ 9,0x32);
   outportb(test+ 9,0x00);
   outportb(test+10,0x64);
   outportb(test+10,0x00);

   do {
      test = 0x1b0;
      outportb(test+3,0x80);
      a = 0;
      subtest();
      for(i=0;i<=1000;i++);
      a = 0xff;
```

```
        subtest();
    } while(!kbhit());
}
```

APPENDIX A
WARRANTY INFORMATION

A.1 Copyright

Each piece of PCI bus 8255 adapter package permits user to use PCI bus 8255 adapter only on a single computer, a registered user may use the 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

DECISION 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 PCI bus 8255 adapter 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 PCI bus 8255 adapter product within the specified warranty period, DECISION 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.

Transportation costs for goods returned must be paid by the purchaser. Repaired goods will be dispatched at the expense of PCI bus 8255 adapter.

To ensure that your PCI bus 8255 adapter product is covered by the warranty provisions, it is necessary that you return the Warranty card.

Under this Limited Warranty, DECISION's obligations will be limited to repair or replacement only, of goods found to be

defective as specified above during the warranty period. DECISION is not liable to the purchaser for any damages or losses of any kind, through the use of, or inability to use, the PCI bus 8255 adapter product.

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

APPENDIX B
DATA SHEET

Please put the data sheet that copy from DCI Smartlab 8255/8253 I/O card.