



## CHAPTER 1

### INTRODUCTION

The 12 bit A/D-D/A card is a high precision data conversion system for PC/486, Pentium, or compatibles. It contains one 12 bits digital to analog channel (setting jumper 2 for selecting unipolar or bipolar) and sixteen 12 bits analog to digital channels (setting jumper 3 for selecting unipolar or bipolar).

#### The features of the 12 bit A/D-D/A board are:

##### D/A:

- Support one 12 bits channel.
- Output voltage. (adjust by VR)  
unipolar: 0V to 9V.  
bipolar: -9V to 9V.
- Unipolar or bipolar selectable,
- Current setting time 500nsec.
- Nonlinearity 0.2%.

##### A/D:

- Support sixteen 12 bits channels.
- Input voltage. (adjust by VR)  
unipolar: 0V to 9V.  
bipolar: -9V to 9V.
- Unipolar or bipolar selectable.
- Successive approximation method.
- Conversion time 60usec. (each channel)

I/O port address: &H278-27F or &H2F8-2FF selectable.



## CHAPTER 2

### UNPACKING INFORMATION

#### Check that your 12 bit A/D-D/A package includes the following items:

- 12 bit A/D-D/A board.
- Demo Program.
- Data Capture Software Manual with Disk.
- User manual.
- Warranty form.

# CHAPTER 3

# HARDWARE INSTALLATION

Your 12 bit A/D-D/A card is designed to be inserted in any available 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 industry card.
2. Remove the cover of the computer.
3. Insert the 12 BIT AD/DA CARD into any available slot. Make sure the adapter is firmly seated in the chosen slot.
4. Replace the cover of the computer.
5. Connects the expansion cable to 25 pin connectors.
6. Turn on the power of your computer.

## CHAPTER 4

## HARDWARE CONFIGURATION

Before you use the A/D-D/A card, you must ensure that the port address and jumper are set correctly, the proper settings for the A/D-D/A card are described in the following:

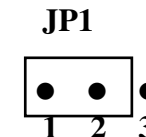
### 4.1 I/O Port Address

The I/O port address are &H278-27F or &H2F8-2FF selectable:

1. 278/2F8 : Output A/D channel number. (low nibble)
2. 279/2F9 : Input A/D low byte data. (8 bits)
3. 27A/2FA : Input A/D high byte data. (low nibble)
4. 27B/2FB : Clear A/D register.
5. 27C/2FC : A/D conversion loop. (low)
6. 27D/2FD : A/D conversion loop. (high)
7. 27E/2FE : Output D/A low byte data. (8 bits)
8. 27F/2FF : Output D/A high byte data. (low nibble)

## 4.2 Jumper Settgong

## 1. I/O Port Address



JP1 is used to select port address.

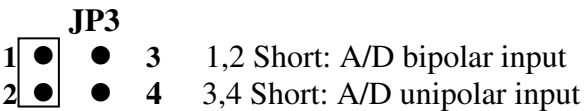
12-Bit A/D-D/A Adapter	1,2 short	2,3 short
Output A/D channel number(low nibble)	H278	H2F8
Input A/D low byte data (8-bit)	H279	H2F9
Input A/D high byte data (low nibble)	H27A	H2FA
Clear A/D Register	H27B	H2FB
A/D conversion loop (low)	H27C	H2FC
A/D conversion loop (high)	H27D	H2FD
Output D/A low byte data (8-bit)	H27E	H2FE
Output D/A high byte data (low nibble)	H27F	H2FF

2. Output Voltage Setting



JP2 is used to select voltage setting

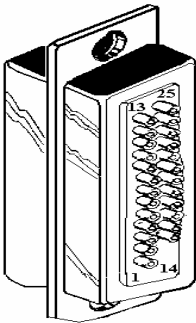
3. Input Settings

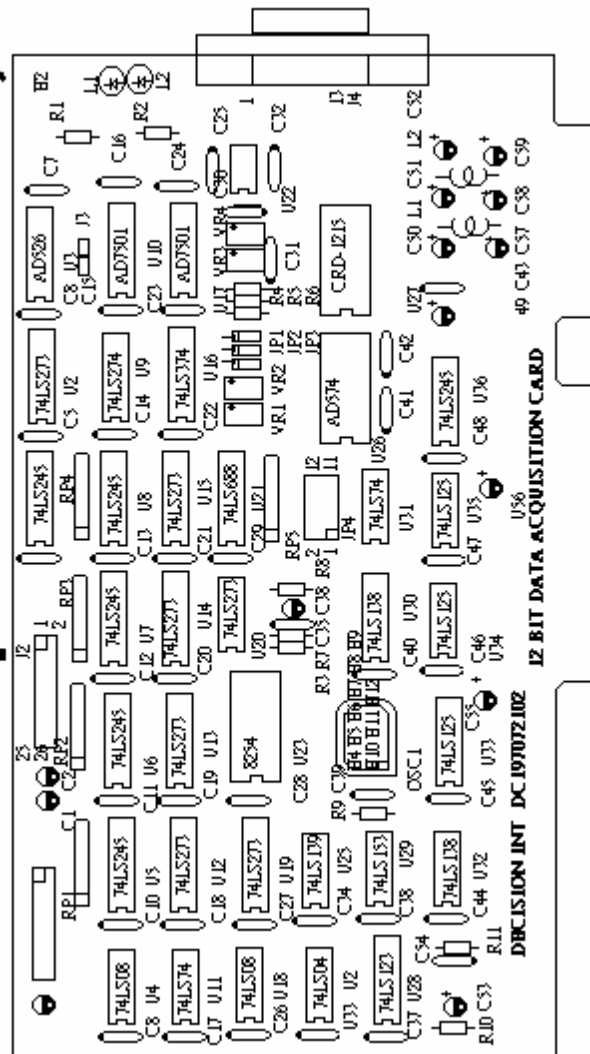


JP3 is used to select input setting

4.3 D Type Connector Pin Assignment

Pin	Function	Pin	Function
1	GND	14	GND
2	D/A OUT	15	-5V
3	+5V	16	GND
4	GND	17	A/D Channel 15
5	A/D Channel 0	18	A/D Channel 14
6	A/D Channel 1	19	A/D Channel 13
7	A/D Channel 2	20	A/D Channel 12
8	A/D Channel 3	21	A/D Channel 11
9	A/D Channel 4	22	A/D Channel 10
10	A/D Channel 5	23	A/D Channel 9
11	A/D Channel 6	24	A/D Channel 8
12	A/D Channel 7	25	-12V
13	+12V		



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## CHAPTER 5

### SOFTWARE DIAGNOSTIC

#### 5.1 Diagnostic Test

1. Insert the demonstration media into drive, then copy diagnostic program into your computer.
2. Key in the BASIC test program, then type run. (please refer section 3)
3. The screen will display:

-----  
which selection do you want?

1. D/A MODE
  2. A/D MODE
- 

4. If you select "1. D/A MODE", pin 2 of D-type connector will output 16 steps saw-tooth wave.
5. If you select "2. A/D MODE", screen will display each value (from 0 to 4095 of the 16 channel).

#### 5.2 Programming Techniques Under MS/DOS

1. Analog to digital (A/D) procedure
  - (1) Output channel number to port  
OUT port , channel
  - (2) Clear register  
OUT (port+3) , 0
  - (3) Start convert  
FOR I = 1 to 5  
A = INP(port + 4)

```

NEXT I
FOR I = 1 to 9
  A = INP(port + 5)
NEXT I

```

(4) Read high byte (low nibble)  
 C = INP(port + 2)  
 HB = (C/16 - INT(C/16)) \* 16

(5) Read low byte (8 bits)  
 LB = INP(port + 1)

(6) Data  
 AD = HB \* 256 + LB

## 2. Digital to analog (D/A) procedure

(1) Output high byte (low nibble)  
 OUT port + 7, Hdata

(2) Output low byte (8 bits)  
 OUT port + 6, Ldata

## 5.3 BASIC Test Program

```

10 CLS: PORT=632
20 LOCATE 5,18: PRINT " 12 BIT AD-DA CONVERSION CARD"
30 LOCATE 6,18: PRINT "===== "
40 LOCATE 9,20: PRINT "1. D/A CONVERSION DEMO"
50 LOCATE 11,20: PRINT "2. A/D CONVERSION DEMO"
60 A$=INKEY$: IF A$="" THEN 60
70 IF A$="1" THEN 200

```

```

80 IF A$="2" THEN 400
90 GOTO 10
200 CLS
202 LOCATE 5,15: PRINT "D/A CINVERSION DEMO"
204 LOCATE 7,15: PRINT "OUTPUT WAVEFORM FROM D/A PORT"
206 LOCATE 9,15: PRINT "PRESS ANY KEY RETURN MENU"
210 OUT PORT+6,0
220 FOR I = 0 TO 15
230 OUT PORT+7, I
240 NEXT I
250 A$=INKEY$: IF A$="" THEN 210
260 GOTO 10
400 CLS
410 FOR CHANNEL = 0 TO 15
420 GOSUB 550
430 B = INP(PORT+2)
440 C = INP(PORT+1)
450 D = (B-16*(INT(B/16))) * 256 + C
460 PRINT " CHANNEL= "; CHANNEL, "DATA= ":D
470 NEXT CHANNEL
480 PRINT:PRINT:PRINT
490 GOTO 410
550 OUT PORT+3,0
560 OUT PORT+0, CHANNEL
570 FOR I = 1 TO 5: A= INP(PORT+4):NEXT I
580 FOR I = 1 TO 9: A= INP(PORT+5):NEXT I
590 RETURN

```

## APPENDIX A

### WARRANTY INFORMATION

#### A.1 Copyright

Copyright 2002, 2003 DECISION COMPUTER INTERNATIONAL CO., LTD. All rights reserved. No part of 12 BIT AD/DA CARD software and manual may be reproduced, transmitted, transcribed, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of DECISION COMPUTER INTERNATIONAL CO., LTD.

Each piece of 12 BIT AD/DA CARD package permits user to use 12 BIT AD/DA CARD 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 12 BIT AD/DA CARD 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 12 BIT AD/DA CARD 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 12 BIT AD/DA CARD.

To ensure that your 12 BIT AD/DA CARD 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 12 BIT AD/DA CARD 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.