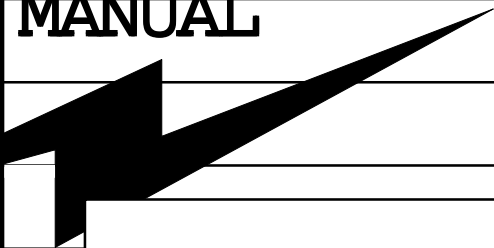# USER'S MANUAL

MIC-2000

Modular Industrial Computer

MIC-2750/2752

16/32-channel Isolated
Digital Output Card

PC-Based Modular Industrial Computer

Designed for Industrial Automation

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Acknowledgments

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Contents

Table of Figures

General information

Introduction

The MIC-2750 offers 16 isolated digital output channels, and the MIC-2752 offers 32 isolated digital output channels. Their isolated output channels provide 2,500 V of protection.

Each output channel corresponds to a bit in a PC I/O port. This makes the MIC-2750 and MIC-2752 very easy to program.

Features

- 16/32 isolated DO channels
- High output driving capacity
- High-voltage isolation on isolated output channels (2,500 V_{DC})
- Connectors:
  MIC-2750: Phoenix terminal (removable)
  MIC-2752: Shrouded header connector
- High sink current on isolated output channels (200 mA/channel)
- LED (red) output logic status indicator (MIC-2750 only)

Applications

- Industrial ON/OFF control
- BCD interfacing
- Digital I/O control
- Industrial and lab automation

Software support

Free drivers can be downloaded from Advantech's home page at http://www.advantech.com.tw/techhome/tech1.htm

Specifications

MIC-2750

Digital outputs
- **Number of outputs:** 16
- **Number of commons:** 2 (internally connected)
- **Output voltage:** 5 to 40 V_{DC}, open collector (NPN)
- **Sink current:** 200 mA max. per channel
- **Isolation voltage:** 2500 V_{DC}
- **Throughput:** 10 kHz

Front LEDs
- **Number of indicator LEDs:** 16
- **Indication mode:**
  Logic "1": LED On
  Logic "0": LED Off

Front headers
- **Type:** Phoenix plug-in screw terminal block (with 20 positions)
- **Pin spacing**: 5.0 mm
- **Wire sizes:** Accepts 0.5 mm to 2.5 mm. 1-#12 or 2-#14 to #22 AWG

Power consumption: 1.5 W @ 5 V

MIC-2752

Digital output
- **Number of output:** 32
- **Number of commons**: 32 (internally connected)
- **Output voltage:** 5 to 40 V_{DC} open collector (NPN)
- **Sink current:** 200 mA max. per channel
- **Isolated voltage:** 2500 V_{DC}
- **Throughput:** 10 kHz

Front Headers
- **Type:** Shrouded header connector

Power consumption: 1 W @ 5 V

Register format

BASE+0 and BASE+1   Isolated DO
BASE+2 and BASE+3   Isolated DO (MIC-2752 only)
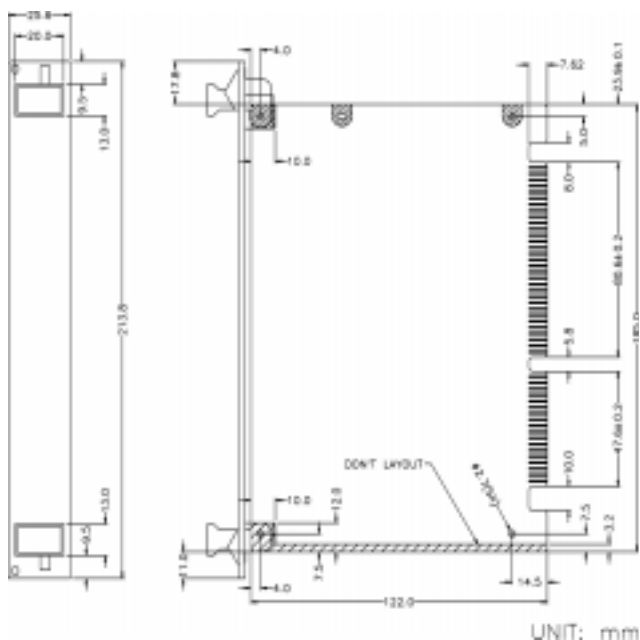

Dimensions

122 mm x 185 mm

Figure 1-1: MIC-2750/2752 layout and dimensions diagram

Installation

Initial inspection

We carefully inspected the MIC-2750/2752 both mechanically and electrically before shipment. It should be free of marks and in perfect order upon receipt.

As you unpack the MIC-2750/2752, check it for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or fails to meet specifications, notify our service department or your local sales representative immediately. Also, call the carrier immediately and retain the shipping carton and packing material for inspection by the carrier. We will then make arrangements to repair or replace the unit.

Discharge any static electricity on your body before you touch the board by touching the back of the system unit (grounded metal).

Remove the MIC-2750/2752 card from its protective packaging by grasping the rear metal panel. Handle the card only by its edges to avoid static electric discharge which could damage its integrated circuits. Keep the antistatic package. Whenever you remove the card from the PC, please store the card in this package for protection.

You should also avoid contact with materials that hold static electricity such as plastic, vinyl and Styrofoam.

Switch and jumper settings

The MIC-2750/2752 card has one function switch and four jumper settings. The following sections explain how to configure the card. You may want to refer to the opposite page for help identifying card components.

Base address selection (SW1)

You control the MIC-2750/2752's operation by reading or writing data to the PC's output port addresses. The MIC-2750/2752 requires four consecutive address locations. Switch SW1 sets the card's base (beginning) address. Valid base addresses range from Hex 000 to Hex 3FC. Other devices in your system may, however, be using some of these addresses.

Card connector, jumper and switch locations
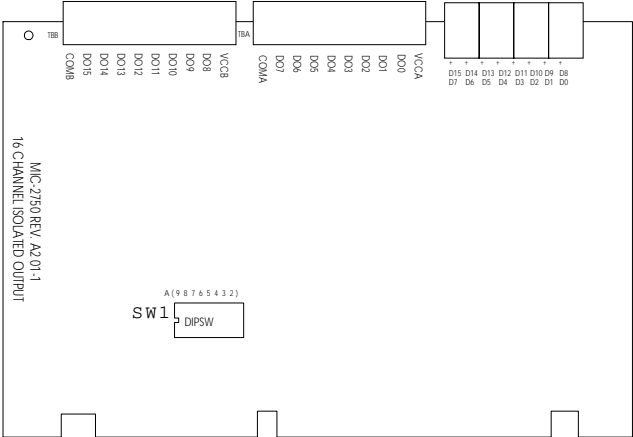
Figure 2-1: MIC-2750
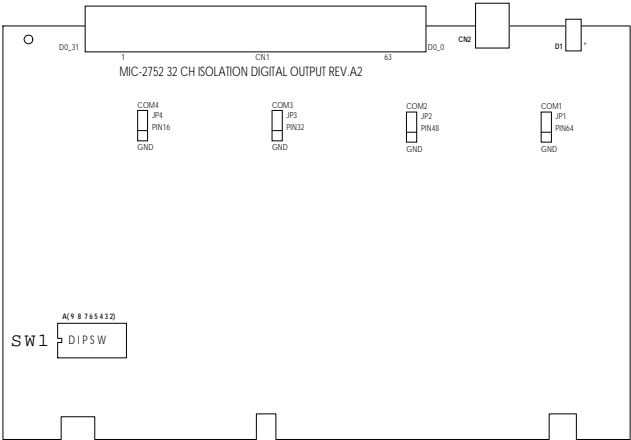
Figure 2-2: MIC-2752

Label	Function	
TBA	Isolated output terminal block	MIC-2750
TBB	Isolated output terminal block	MIC-2750
SW1	Card base address	MIC-2750/2752
CN1	Isolated output connector	MIC-2752
JP1~JP4	Set pins 16, 32, 48, 64 to GRD/external V_{cc}	MIC-2752

We set the MIC-2750/2752 for a base address of Hex 300 at the factory. If you need to adjust it to some other address range, set switch SW1 as shown in the following tables:

MIC-2750/2752

Card I/O addresses (SW1)								
Range (hex)	**Switch position**							
	1	2	3	4	5	6	7	8
200 – 203	O	●	●	●	●	●	●	●
204 – 207	O	●	●	●	●	●	●	O
x								
* 300 – 303	O	O	●	●	●	●	●	●
x								
3F0 – 3F3	O	O	O	O	O	O	●	●
3F4 – 3F7	O	O	O	O	O	O	●	O

O = Off   ● = On   * = default

Note: Switches 1-8 control the PC bus address lines as shown below:

Switch	1	2	3	4	5	6	7	8
Line	A9	A8	A7	A6	A5	A4	A3	A2

Jumper settings (MIC-2752 only)

Pins 16, 32, 48 and 64 in the MIC-2752 can be connected to GND or external V_{CC} for integral clamp diodes by JP1 ~ JP4.

COM 1/2/3/4

pins 16, 32, 48 or 64

GND
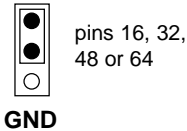
Connect pins 16, 32, 48 or 64 to external V_{CC} for clamp diodes

COM 1/2/3/4

pins 16, 32, 48 or 64

GND
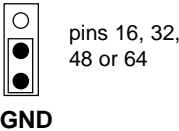
Connect pins 16, 32, 48 or 64 to GND

Signal connections

Good signal connections can avoid a lot of unnecessary damage to your valuable PC and other hardware. This chapter gives pin assignments for each of the card's connectors and signal connections for different applications.

Connector pin assignments

The MIC-2750 has plug-in screw terminal blocks that are accessible from the card bracket. See the figure on page 7 for the location of each connector.

Pin assignments for each connector appear in the following sections.

MIC-2750

VCCA	1		VCCB	1
DO0	2		DO8	2
DO1	3		DO9	3
DO2	4		DO10	4
DO3	5		DO11	5
DO4	6		DO12	6
DO5	7		DO13	7
DO6	8		DO14	8
DO7	9		DO15	9
COMA	10		COMB	10

TBA   **TBB**

Abbreviations

VCCA, VCCB	External V_{CC} for clamp diodes
COMA, COMB	External ground for isolated output
D0 ~ D15	Isolated output

The MIC-2752 has a 64-pin ribbon cable connector that is accessible from the card bracket. See the figure on page 7 for the location of each connector.

MIC-2752

GND/COM1	**64**	**63**	DO0
GND	**62**	**61**	DO1
GND	**60**	**59**	DO2
...	**.**	**.**	...
GND	**.**	**.**	
GND/COM2	**48**	**.**	
GND	**.**	**.**	
...	**.**	**.**	
GND	**.**	**.**	
GND/COM3	**32**	**.**	
GND	**.**	**.**	
...	**.**	**.**	
GND	**.**	**.**	
GND/COM4	**16**	**.**	
GND	**.**		
...	**.**	**5**	DO29
...	**4**	**3**	DO30
GND	**2**	**1**	DO31

CN1

Abbreviations	
COM 1/2/3/4	External V_{cc} for clamp diodes
GND	External ground for isolated output
D00 ~ DO31	Isolated output

Pins 16, 32, 48 and 64 can be set to GND or COM 1/2/3/4 by JP1 ~ JP4.

A wiring cable is included with the MIC-2752. Connectors CN2 and CN3 can be connected to the optional ADAM-3937 wiring board.
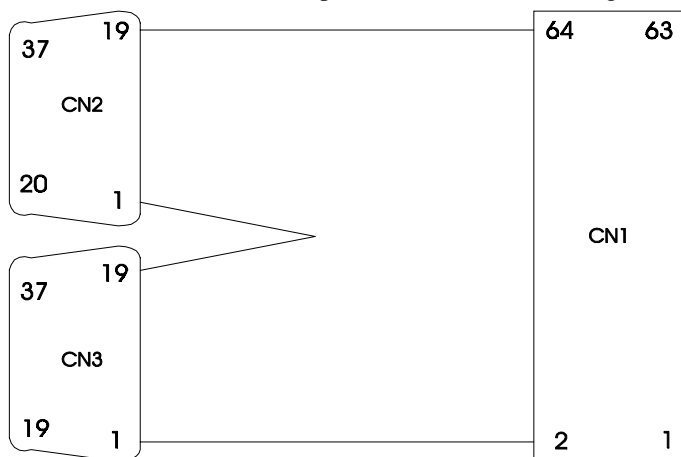

Figure 3-1: MIC-2752 (connectors CN2, CN3) wiring diagram to ADAM-3937

CN 1-64	⇧	CN 2-35	CN 1-63	⇧	CN 2-16
CN 1-62	⇧	CN 2-34	CN 1-61	⇧	CN 2-15
CN 1-60	⇧	CN 2-33	CN 1-59	⇧	CN 2-14
CN 1-58	⇧	CN 2-32	CN 1-57	⇧	CN 2-13
CN 1-56	⇧	CN 2-31	CN 1-55	⇧	CN 2-12
CN 1-54	⇧	CN 2-30	CN 1-53	⇧	CN 2-11
CN 1-52	⇧	CN 2-29	CN 1-51	⇧	CN 2-10
CN 1-50	⇧	CN 2-28	CN 1-49	⇧	CN 2-9
CN 1-48	⇧	CN 2-27	CN 1-47	⇧	CN 2-8
CN 1-46	⇧	CN 2-26	CN 1-45	⇧	CN 2-7
CN 1-44	⇧	CN 2-25	CN 1-43	⇧	CN 2-6
CN 1-42	⇧	CN 2-24	CN 1-41	⇧	CN 2-5
CN 1-40	⇧	CN 2-23	CN 1-39	⇧	CN 2-4
CN 1-38	⇧	CN 2-22	CN 1-37	⇧	CN 2-3
CN 1-36	⇧	CN 2-21	CN 1-35	⇧	CN 2-2
CN 1-34	⇧	CN 2-20	CN 1-33	⇧	CN 2-1
CN 1-32	⇧	CN 3-35	CN 1-31	⇧	CN 3-16
CN 1-30	⇧	CN 3-34	CN 1-29	⇧	CN 3-15
CN 1-28	⇧	CN 3-33	CN 1-27	⇧	CN 3-14
CN 1-26	⇧	CN 3-32	CN 1-25	⇧	CN 3-13
CN 1-24	⇧	CN 3-31	CN 1-23	⇧	CN 3-12
CN 1-22	⇧	CN 3-30	CN 1-21	⇧	CN 3-11
CN 1-20	⇧	CN 3-29	CN 1-19	⇧	CN 3-10
CN 1-18	⇧	CN 3-28	CN 1-17	⇧	CN 3-9
CN 1-16	⇧	CN 3-27	CN 1-15	⇧	CN 3-8
CN 1-14	⇧	CN 3-26	CN 1-13	⇧	CN 3-7
CN 1-12	⇧	CN 3-25	CN 1-11	⇧	CN 3-6
CN 1-10	⇧	CN 3-24	CN 1-9	⇧	CN 3-5
CN 1-8	⇧	CN 3-23	CN 1-7	⇧	CN 3-4
CN 1-6	⇧	CN 3-22	CN 1-5	⇧	CN 3-3
CN 1-4	⇧	CN 3-21	CN 1-3	⇧	CN 3-2
CN 1-2	⇧	CN 3-20	CN 1-1	⇧	CN 3-1

Figure 3-2: CN1, CN2, CN3 pin connection mapping

Signal connections

Isolated output

The MIC-2750 has 16 isolated digital outputs.

Connect the V_{DD} to VCCA or VCCB as shown in the diagram below. The card will sink your drive current from only V_{DD} when its isolated digital output goes high (max. 200 mA per channel), in which case the current will then flow through COMA or COMB. The following figure shows how to connect an external output load to the card's isolated outputs:
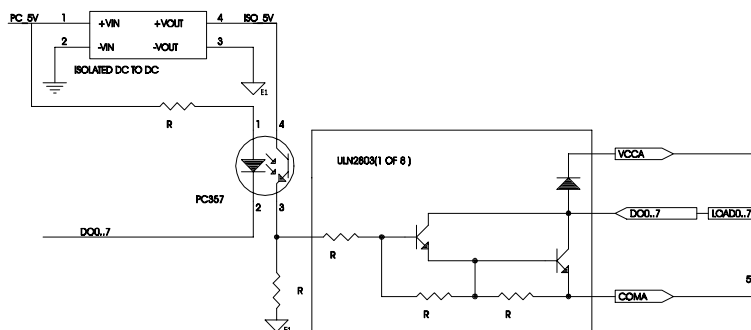

Figure 3-3: 2803 open collector(NPN)
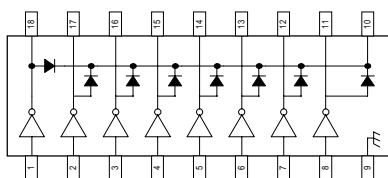
ULN 2803

Figure 3-4: ULN 2803 pin configuration

MIC-2752

The MIC-2752 has 32 isolated digital outputs.

Connect the VDD to COM1 (2, 3, 4) as shown in the following diagram. The card will sink current from only VDD when its isolated digital output goes high (maximum 200 mA per channel), in which case the current will then pass through the GND. The following figure shows how to connect an external output load to the card's isolated outputs.
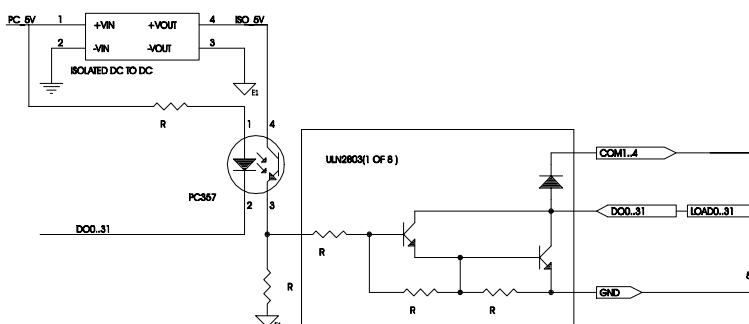

Figure 3-4: 2803 open collector (NPN)

Register format

Programming the MIC-2750/2752 is extremely simple. Each I/O channel corresponds to a bit in the card's registers. To turn on an output channel you write a "1" to the corresponding bit.

The MIC-2750 requires eight I/O register addresses, but you only need to access the first two registers (data registers). The MIC-2752 requires four I/O register addresses, each of which needs to be accessed. The address of each register is specified as an offset from the card's base address. For example, BASE+0 is the card's base address and BASE+2 is the base address + two bytes. If the card's base address is 300h, the register's address is 302h. See Chapter 2 for information on setting the card's base address.

Register assignments are as follows:

	Write	Read	
BASE+0	DO bits 0-7	N/A	MIC-2750/2752
BASE+1	DO bits 8-15	N/A	MIC-2750/2752
BASE+2	DO bits 16-23	N/A	MIC-2752
BASE+3	DO bits 24-31	N/A	MIC-2752

User's note for MIC-2750 (PNP) only:

Isolated output

The MIC-2750 has 16 isolated digital outputs.

Connect the V_{DD} to VCCA or VCCB as shown in the diagram below. The card will drive your drive current from only V_{DD} when its isolated digital output goes high (max. 200 mA per channel), in which case the current will then flow through COMA or COMB. The following figure shows how to connect an external output load to the card's isolated outputs:

Figure 4-1: 2981 open emitter (PNP)

Figure 4-2: UDN 2981 pin configuration