



**Intronics  
Power®**

## CMOS STD Compatible Analog and Digital I/O Cards

### RTI-1280 Series

#### FEATURES

##### RTI-1280 Analog Input Card

- 16SE/8D Analog Input Channels
- Jumper Selectable Gains of 1, 10, 100 and 500
- 12-Bit A/D Resolution

##### RTI-1281 Analog Input/Output Card

- (Same Features as RTI-1280 and Includes)
- 2 Analog Output Channels
- 12-Bit Resolution

##### RTI-1282 Analog Output Card

- 4 or 8 Analog Outputs
- 12-Bit Resolution
- 4-20mA Current Loop Outputs (optional)

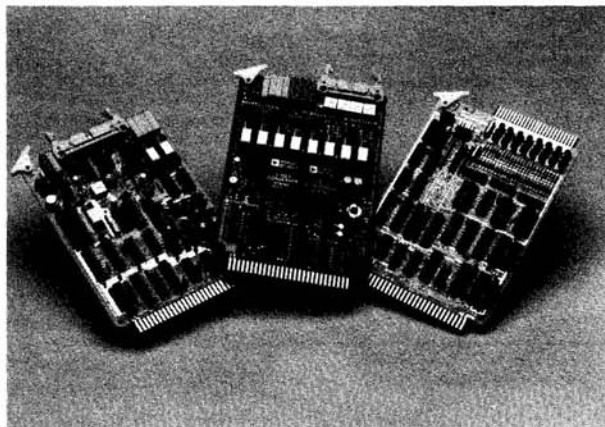
##### RTI-1287 Digital Input/Output Card

- 24 Digital Input/Output Channels
- Three 8-Bit Read/Write Ports Control 24 Bidirectional Lines

Compatible to Industry Standard I/O Relay Rack  
(OPTO-22, Gordos)

#### GENERAL

- Low Power CMOS Design
- Compatible to all CMOS STD CPU Cards
- Memory or Port I/O Configurable
- Single +5V Power Requirement
- 25°C to +85°C Temperature Range



digital I/O card (RTI-1287): each of which interfaces to the CMOS STD bus as either memory mapped or I/O port addressed peripherals through user-selectable jumpers.

#### APPLICATIONS

This family of CMOS STD BUS I/O cards from Analog Devices solves the problem of interfacing real-world signals to the  $\mu$ C bus. Using new high-speed analog and digital CMOS technology, these cards offer low power, high noise immunity and extended operating temperature ranges. Described in this technical document are analog and digital interface cards designed for use in harsh environments, remote sites, and battery-backed applications. Applications for these products include:

- Well Site Supervision
- Pipeline Monitoring
- Meteorological Data Acquisition
- Process Control
- Medical Electronics
- Battery-Powered Instrumentation
- SCADA Systems
- Energy Management

#### SERIES DESCRIPTION

The RTI-1280 Series products are analog and digital input/output cards that are compatible with the CMOS STD bus. Designed with high-speed, low-power CMOS technology, these products provide low-power, high noise immunity, and extended temperature ranges operation. They are cost effective and provide a convenient means of interfacing your CMOS STD bus micro-computer to the real (i.e., analog and digital) world.

The series consists of an analog input card (RTI-1280), an analog I/O card (RTI-1281), an analog output card (RTI-1282) and a

Card Type	Model Number	Channel Capacity	
		Input	Output
Analog Input	RTI-1280	16SE/8D	—
Analog Input/Output	RTI-1281	16SE/8D	2
Analog Output	RTI-1282-4	—	4
Analog Output	RTI-1282-8	—	8
Digital Input/Output	RTI-1287	24 I/O	

Table I. RTI-1280 Series Functional Chart

# SPECIFICATIONS (typical @ 25°C with nominal supply voltage unless otherwise noted)

## ANALOG INPUTS RTI-1280/1281

Number of Input Channels	16 Single-Ended, 16 Pseudo-Differential or 8 Differential (Jumper Selectable)
Input Overvoltage Protection <sup>1</sup>	± 35V (Dielectrically Isolated)
Input Impedance	> 10 <sup>8</sup> Ω
Input Bias Current	± 50nA
Common-Mode Voltage (CMV)	± 10V min
Instrumentation Amplifier Gain Ranges <sup>2</sup>	1, 10, 100, 500 (Jumper Selectable) (Provisions for a Resistor Programmable Gain Up to 1000)
Common-Mode Rejection Ratio (CMRR)	86dB
A/D Ranges	0 to + 10V, ± 10V (Jumper Selectable)
A/D Resolution	12 Bits
A/D Conversion Time	55μs
Throughput (Multiple Channels)	12,000 Channels/sec (Gain = 1, 10) 10,000 Channels/sec (Gain = 100) 7,500 Channels/sec (Gain = 500) 16,000 Channels/sec (Gain = 1, 10, 100)
(Single Channel)	
Temperature Coefficients	
Gain	± 30ppm/°C of FSR (Gain = 1) ± 100ppm/°C of FSR (Gain = 500)
Offset	± 30ppm/°C of FSR (Gain = 1) ± 100ppm/°C of FSR (Gain = 500)
Differential Nonlinearity	± 1/2LSB
Total System Errors	± 0.02% of FSR (G = 1) ± 0.05% of FSR (G = 10) ± 0.07% of FSR (G = 100) ± 0.1% of FSR (G = 500)

## ANALOG OUTPUT RTI-1281/1282

Number of Output Channels	2 (RTI-1281) 4 (RTI-1282-4) 8 (RTI-1282-8)
D/A Input Codes	Binary, Offset Binary (Jumper Selectable)
Output Voltage Ranges	0 to + 5V, 0 to + 10V, ± 5V, ± 10V @ 2mA (Jumper Selectable)
Output Current Range	4 to 20mA Using V/I Converters' Option (RTI-1282 Only)
Differential Nonlinearity	± 1/2LSB
Nonlinearity	± 0.01% of FSR
Gain Error (Adjustable to Zero)	± 0.01% <sup>6</sup>
Offset Error (Adjustable to Zero)	± 0.01% <sup>6</sup>
Output Settling Time	200μs (to ± 1/2LSB) for Full Scale Step Change
Temperature Coefficient	
Gain <sup>3</sup>	± 35ppm/°C of FSR
Offset	± 15ppm/°C of FSR

## DIGITAL INPUT/OUTPUT RTI-1287

MNEM	MIN	TYP	MAX	UNITS
V <sub>OL</sub> Low Level Voltage (I <sub>OL</sub> = 20mA)		0.2	0.4	V
I <sub>OL</sub> Low Level Current (V <sub>OL</sub> = +.4V)	20	25		mA
V <sub>OH</sub> High Level Voltage (I <sub>OH</sub> = -0.118mA)		2.4		V
I <sub>OH</sub> High Level Current (V <sub>OH</sub> = +2.4V)	- .118			mA
V <sub>EXT</sub> Supply Voltage to Module Rack	+ 4.5		+ 30.0	V
I <sub>EXT</sub> Supply Current to module rack			500	mA
I <sub>CC</sub> Supply Current (V <sub>CC</sub> = + 5.0V ± 10%) All Outputs ON	40	50		mA
All Outputs OFF	6	9		mA

## I/O CONNECTION

RTI-1280/1281	3M #3494, 34-Pin IDE
RTI-1282	3M #3429, 26-Pin IDE
RTI-1287	50-Pin, Edge Connector, 0.1" Spacing

## INTERFACE PARAMETERS

Compatibility	STD CMOS Bus (Processor Independent)
Implementation	Memory or I/O Port Mapped
Expansion Option	MEMEX and IOEXP Fully Supported via Jumper Options
Address Selection	Jumper Selectable

## POWER REQUIREMENTS<sup>4</sup>

RTI-1280	
Sleep Mode	270mW typ, 380mW max
Multiple Conversion Mode	440mW typ, 580mW max
RTI-1281	
Sleep Mode	270mW typ, 380mW max
Multiple Conversion Mode	500mW typ, 740mW max
RTI-1282-4	350mW typ, 650mW max <sup>5</sup>
RTI-1282-8	550mW typ, 1.1W max <sup>5</sup>
RTI-1287	30mW (All Outputs OFF) 275mW max (All Outputs ON, V <sub>CC</sub> = + 5.5V) + 5V ± 10% (On-Board dc/dc Converter Generates ± 15V to Power Analog Circuit)
Voltage	

## ENVIRONMENTAL

Operating Temperature	- 25°C to + 85°C ( - 40°C to + 85°C on RTI-1287)
Storage Temperature	- 55°C to + 85°C
Relative Humidity, Noncondensing	0 to 95%

## NOTES

- <sup>1</sup>specified for a single channel with power applied, ± 20V with power off.
- <sup>2</sup>gain ranges above 500 (through user-installed resistor) may be subject to higher differential nonlinearity errors.
- <sup>3</sup>± 5ppm/°C of FSR from 0 to + 85°C.
- <sup>4</sup>Maximum power specified at V<sub>CC</sub> = + 5.5V, output current of 2mA where applicable.
- <sup>5</sup>Does not include optional V/I converter (OA08) at 50mW each.
- <sup>6</sup>Accuracy at factory calibrated range of ± 10V. Error at 0 to + 5V is ± 0.09 typ which is adjustable to zero.
- FSR = Full Scale Range.
- Specifications subject to change without notice.

## GENERAL DESCRIPTION

The RTI-1280 and RTI-1281 provide data acquisition for 16 single-ended or 8 differential channels. Included is an instrumentation amplifier with jumper selectable gains of 1, 10, 100 and 500, a sample-and-hold circuit and a 12-bit A/D converter. This high performance data acquisition section features  $\pm 0.02\%$  accuracy, 12-bit resolution with throughput speeds of 16,000 channels per second for single channel scans and 12,000 channels per second for multiple channel scans. The RTI-1281 also contains two, 12-bit D/A converters giving  $\pm 0.01\%$  accuracy. The input section can be configured to generate an interrupt at the end on a conversion or be serviced by the CPU in the polled status mode.

To reduce power consumption, when the card is not performing A/D conversions, a "sleep" mode feature is available through software.

The RTI-1282 analog output card comes in two versions: a 4-channel (RTI-1282-4) and 8-channel (RTI-1282-8) for high channel capacity applications. In addition two channels can be configured for 4-20mA outputs by using optional voltage-to-current converters which install on the card.

Analog signal connections are made using reliable socket and header connectors with locking tabs which enable flat ribbon cables to be connected. An optional screw termination panel (AC1585) is offered for simple and convenient field wire connections.

The RTI-1287 digital I/O card provides three 8-bit I/O ports. The inputs are active low and have input filtering as well as a threshold adjustment by user installed resistors. The outputs are open collector active low and capable of sinking 20mA with the option of increasing its capability to 100mA with user installed resistors networks. All outputs are protected for inductive kick-back as well as reverse voltage. Connection to the RTI-1287 is supplied through a 50-pin card edge connector and is compatible with industry's standard solid state I/O racks (OPTO-22, Gordos or equivalent). Power for the rack is jumper selectable for +5V, +12V (from the STD bus) or an external voltage source up to +30V.

The RTI-1287 is software and hardware compatible to the 76C04. Features over competitive digital cards include interrupt generation on four of the input lines for use with a parallel interrupt encoder card, selectable initialization states on all I/O channels and jumper selectable voltage sources of up to +30V for powering solid-state relay racks.

All cards interface to the STD bus as a block of successive bytes in either memory or port I/O addressing space. Memory and port I/O extensions are also decoded to provide the maximum flexibility.

The analog cards have an on-board dc/dc converter, allowing them to operate from the STD bus +5V supply. All analog boards have an operating temperature range of  $-25^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  and the RTI-1287 operates from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

## CMOS REPLACEMENT FOR RTI-1260 AND RTI-1262

The RTI-1280 series products have been designed to allow current users of NMOS products to easily convert over to these new CMOS products. The following table gives you a comparison of equivalent products:

Function/Feature	Analog Input		Analog Output	
	RTI-1280 (CMOS)	RTI-1260 (NMOS)	RTI-1282-4 (CMOS)	RTI-1262 (NMOS)
Analog Connector and Pinout	34-Pin	50-Pin	Same	
Programmable Gain	Pin programmable	Resistor programmable	—	—
Data Throughput	12,000 Channels/Sec (G = 1)	25,000 Channels/Sec	—	—
D/A Settling Time	—	—	200 $\mu\text{s}$	25 $\mu\text{s}$
Power Consumption	350mW	2.25W	400mW	2.75W
Memory Map	Same		Same	

Table II. RTI-1280 vs. RTI-1260 Comparison

# RTI-1280 ANALOG INPUT CARD RTI-1281 ANALOG INPUT/OUTPUT CARD

## GENERAL DESCRIPTION

The RTI-1280 and RTI-1281 analog input section is used to acquire analog signals and present them in a digital form to the microcomputer. The data acquisition section consists of a multiplexer, a pin programmable gain instrumentation amplifier, a sample-and-hold circuit and a 12-bit A/D converter. Associated interface logic is also included for transferring the resultant digital data to the bus. The block diagram is shown in Figure 1. The RTI-1281 also has analog outputs. This section consists of two 12-bit D/A converters which provide voltage outputs for analog control applications.

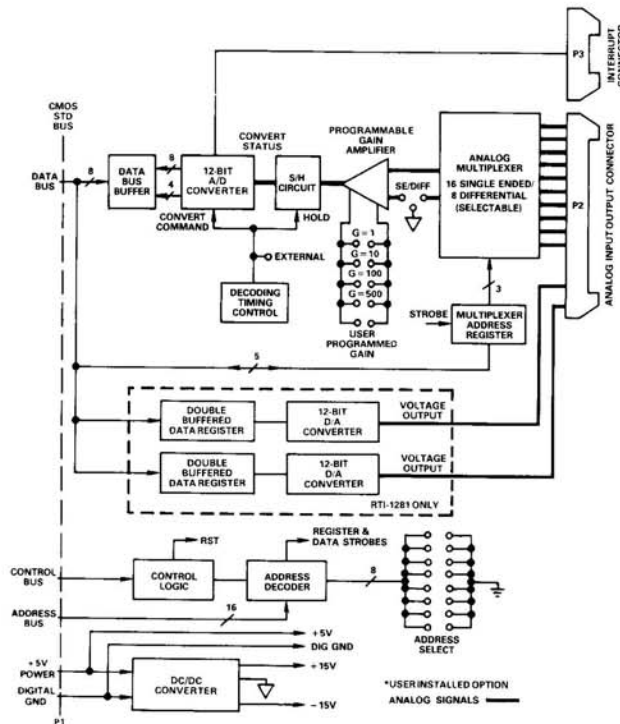


Figure 1. RTI-1280/1281 Block Diagram

The RTI-1280/1281 features a software selectable sleep mode which puts the analog circuit into a quiescent state and reduces power consumption by 40%. In this mode,  $\pm 15V$  power is disconnected to all analog circuitry except the input multiplexer to maintain input protection and impedance. During periods of time when A/D conversions are not required, this feature can be used. A/D conversions can be initiated in either the normal software mode or with an external trigger pulse. Using the external convert mode A/D conversions can take place every 60 $\mu$ s.

### Multiplexer

The card is jumper selectable for either 16 channels single-ended, 16 channels pseudo-differential or 8 channels differential. The multiplexers are dielectrically isolated and can handle inputs of up to  $\pm 35V$  without damage.

### Instrumentation Amplifier

The output of the multiplexers are connected to a pin programmable amplifier which is jumper selectable for gains of 1, 10, 100 and 500. Binding posts for an external resistor allow the

user to select a fifth gain ( $G = 1 + 40k/R_G$ ) up to 1000. The programmable gain increases the A/D converter sensitivity as shown in Table III.

GAIN	SIGNAL RANGE	LSB VALUE*	THROUGHPUT
1	$\pm 10V$	4.88mV	12kHz
10	$\pm 1V$	488 $\mu$ V	12kHz
100	$\pm 100mV$	48.8 $\mu$ V	10kHz
500	$\pm 20mV$	9.76 $\mu$ V	7.5kHz
user programmed	$\pm 10mV$ to $\pm 10V$		

\*Assuming  $\pm 10V$  input range on A/D, multiple channel scan.

Table III.

### Sample-Hold Circuit

The output of the instrumentation amplifier is connected to the sample-and-hold circuit, which "freezes" the analog input voltage while the A/D converter is performing a conversion. This prevents the voltage from changing while the conversion is taking place.

### Analog/Digital Converter

The RTI-1280 and RTI-1281 contain a 12-bit CMOS A/D converter optimized for low power as well as high speed conversion. The analog input ranges are 0 to +10V (unipolar) and  $\pm 10V$  (bipolar). The analog signal is digitized into an equivalent 12-bit digital representation.

### Data Registers (RTI-1281 only)

To set the input of a D/A converter, double buffered data registers are used which allows two bytes of data to be loaded simultaneously into the D/A converter. These registers "memorize" the 12-bit digital word and keeps the D/A converter output constant until it is updated with a new value.

### Digital/Analog Converter (RTI-1281 only)

The RTI-1281 contains two CMOS 12-bit D/A converters. Each converter can be independently selected and configured for output ranges of 0 to +5V, 0 to +10V,  $\pm 5V$  or  $\pm 10V$ . The 12-bit resolution provides least significant bit values down to 1.22mV using the 0 to +5V range.

### Power Supply (dc/dc)

The RTI-1280 and RTI-1281 have an on-board high efficiency dc/dc converter which converts the +5V logic voltage on the STD bus to a low noise, isolated  $\pm 15V$  required by the analog circuitry.

## PROGRAMMING

The programming of the RTI-1280/1281 card is very straightforward. The card can be addressed as either successive bytes of memory or a block of I/O ports.

### Address Selection

The RTI-1280/1281 occupies 8 consecutive bytes of address space with a base address of XFY8 where X and Y are selected by jumpers. The user may choose to locate the card in either normal, extended memory or I/O space. The base address is determined by on-board jumpers which can be configured to any of the 256 locations in the 64k of normal or extended address space. In the I/O port mode of operation, the RTI-1280/1281 occupies 8 consecutive ports in either an 8-bit or 16-bit port image.



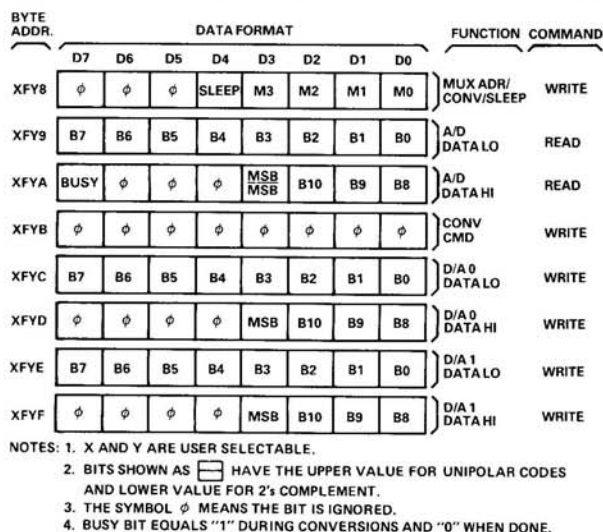


Figure 2. RTI-1280/1281 Memory/Port Map

### RTI-1281 Only

Two bytes, D/A DATA LO and D/A DATA HI are assigned to each 12-bit D/A converter. The D/A data is double buffered on the card so that the data from both bytes are loaded into the D/A when the D/A HI byte is written to, therefore ensuring one step update of the analog output.

### Software Operation

In the memory map mode, the RTI card is treated as a block of memory and simple memory read and write instructions can be used. In the I/O port addressing mode simple input and output instructions are used.

### MUX ADDRESS/CONV SLEEP BYTE

Any random input channel can be selected by writing the channel address code into the lower four bits (D0-D3) of the MUX ADDRESS/CONV SLEEP BYTE. This write command also triggers a timer which automatically sets the S/H into the hold mode and starts the A/D conversion. This A/D conversion can also be initiated via an external control line.

Sleep operation is invoked by setting D4 to a logic "1" and disabled when the multiplexer/channel address is updated.

### A/D DATA LO BYTE

The 8 lowest order bits of the A/D 12-bit word are available at this address.

### A/D HI BYTE

The 4 highest order bits of the A/D 12-bit word are available at this address. In addition, the BUSY bit provides the status of the A/D converter. The CPU determines the end of conversion by reading this byte. A logic "0" indicates that the conversion is complete and the A/D data can now be read.

### D/A DATA LO

This byte is written to with the 8 least significant bits of D/A data.

### D/A DATA HI

This byte is written to with the 4 most significant bits of D/A data.

## RTI-1282 ANALOG OUTPUT CARD

### GENERAL DESCRIPTION

The RTI-1282 takes a digital word from the microcomputer and converts it into an analog signal (voltage or current). As shown in Figure 3, a typical output channel consists of a data storage register, a 12-bit D/A converter and associated bus interface circuitry. Two of the voltage output channels can be converted to a 4-20mA current loop. This analog output card comes in two versions: a 4-channel (RTI-1282-4) and an 8-channel (RTI-1282-8) for high channel capacity applications.

### Digital/Analog Converter

The RTI-1282 contains four or eight 12-bit CMOS D/A converters. Each converter can be independently selected and configured for output ranges of 0 to +5V, 0 to +10V,  $\pm 5V$  or  $\pm 10V$ . The 12-bit resolution provides least significant bit values down to 1.22mV in the 0 to +5V range.

### Current Output (V/I)

It is often desirable to transmit an analog signal as a current rather than a voltage since noise and IR drops in the cable and connectors degrade the signal. Two voltage output channels can be converted to a 4-20mA current loop output by adding a user installed V/I converter option (ADI P/N OA08). This module meets all requirements of the ISA-S50.1 Standard for Type 3, Class L, nonisolated 4-20mA current loop transmitters. A user supplied +15V to +30V source is required to power this loop.

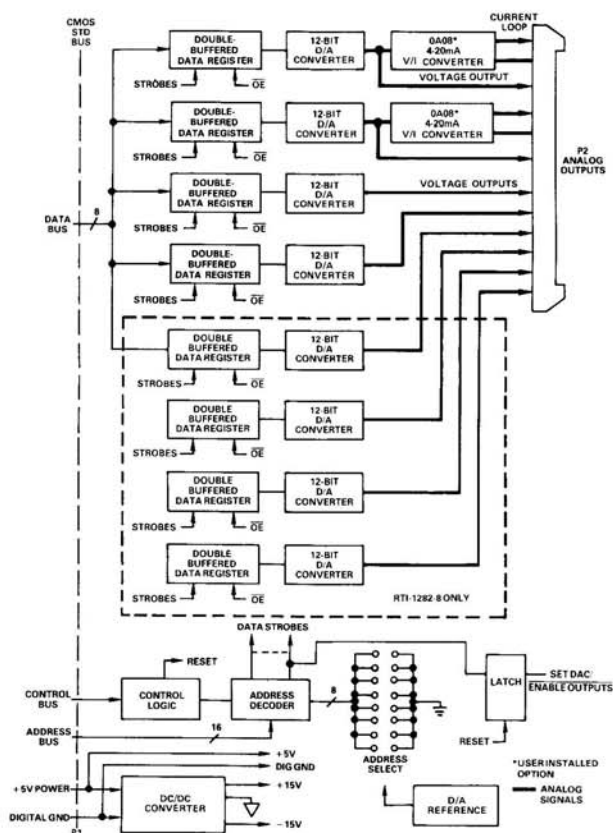


Figure 3. RTI-1282 Block Diagram

## Power Supply (dc/dc)

The RTI-1282 has an on-board high efficiency dc/dc converter which converts the +5V logic voltage on the STD bus to a low noise, isolated  $\pm 15V$  required by the analog circuitry.

## PROGRAMMING

The programming of the RTI-1282 is very straightforward. The card can be addressed as either successive bytes of memory or a block of I/O ports.

### Address Selection

The RTI-1282 occupies 16 consecutive bytes of address space with a base address of XFY0 where X and Y are selected by jumpers. The user may choose to locate the card in either normal or extended memory or I/O space. The base address is determined by on-board jumpers which can be configured to any one of 256 locations in the 64k of normal or extended address space. In the port I/O mode of operation, the RTI-1282 occupies 16 consecutive ports in either an 8-bit or 16-bit port image.

### Software Operation

In the memory map mode, the RTI card is treated as a block of memory; and simple memory read and write instructions can be used. In the I/O port addressing mode, simple input and output instructions are used. Two bytes, D/A DATA LO and D/A DATA HI are assigned to each 12-bit D/A converter. The D/A data is double buffered on the RTI card so that the data from both bytes are loaded into the D/A when the D/A HI byte is written to, therefore ensuring one step update of the D/A output.

### D/A DATA LO

This byte is written to with the 8 least significant bits of D/A data.

### D/A DATA HI

This byte is written to with the 4 most significant bits of D/A data.

BYTE ADDR.	DATA FORMAT								FUNCTION	OPER.
XFY0	B <sub>7</sub>	B <sub>6</sub>	B <sub>5</sub>	B <sub>4</sub>	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	LSB	D/A DATA 0 LO	WRITE
XFY1	$\phi$	$\phi$	$\phi$	$\phi$	MSB	B <sub>10</sub>	B <sub>9</sub>	B <sub>8</sub>	D/A DATA 0 HI	WRITE
XFY2	B <sub>7</sub>	B <sub>6</sub>	B <sub>5</sub>	B <sub>4</sub>	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	LSB	D/A DATA 1 LO	WRITE
XFY3	$\phi$	$\phi$	$\phi$	$\phi$	MSB	B <sub>10</sub>	B <sub>9</sub>	B <sub>8</sub>	D/A DATA 1 HI	WRITE
...										
XFYC	B <sub>7</sub>	B <sub>6</sub>	B <sub>5</sub>	B <sub>4</sub>	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	LSB	D/A DATA 6 LO	WRITE
XFYD	$\phi$	$\phi$	$\phi$	$\phi$	MSB	B <sub>10</sub>	B <sub>9</sub>	B <sub>8</sub>	D/A DATA 6 HI	WRITE
XFYE	B <sub>7</sub>	B <sub>6</sub>	B <sub>5</sub>	B <sub>4</sub>	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	LSB	D/A DATA 7 LO	WRITE
XFYF	$\phi$	$\phi$	$\phi$	$\phi$	MSB	B <sub>10</sub>	B <sub>9</sub>	B <sub>8</sub>	D/A DATA 7 HI	WRITE

NOTES: 1. X and Y ARE USER SELECTABLE.  
2. THE SYMBOL  $\phi$  MEANS THE BIT IS IGNORED.

Figure 4. RTI-1282 Memory/Port Map

## RTI-1287 DIGITAL INPUT/OUTPUT CARD

### GENERAL DESCRIPTION

The RTI-1287 is a 24-channel Digital I/O card which interfaces to the CMOS STD bus. The 24 I/O channels are connected through a 50-pin edge connector. The pinout is compatible to industry's standard I/O relay rack (OPTO-22, Gordos). The RTI-1287 can also be used as a general purpose TTL/CMOS interface card. Three 8-bit read/write ports control 24 bidirectional signal lines. All I/O lines are diode clamped for negative spikes below ground potential and for positive spikes above  $V_{EXT}$ . Figure 5 indicates a typical bidirectional I/O circuit. All input channels are active low and are terminated with a 22k ohm pull-up resistor to the external load voltage,  $V_{EXT}$  (up to +30V). The switching threshold may be changed by adding a user installed resistor (R1). Each input also contains an RC filter and Schmitt Trigger to provide ultimate noise immunity for industrial applications.

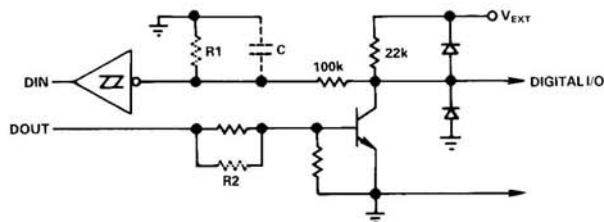


Figure 5. Typical Bidirectional I/O Circuit

Four input channels have voltage level translators and are capable of generating an interrupt which can be connected to a Priority Interrupt Controller Card using the P3 connector. Each output channel has an open collector capable of sinking 20mA with the option of increasing to 100mA with user installed resistors (R2). All outputs can drive relay loads directly since they have diode clamps which protected against inductive kick backs as well as reverse voltage.

Power for biasing the I/O modular rack is jumper selectable. There are turrets on the card allowing the user to connect either the STD bus +5Vdc supply or + $V_{EXT}$  (for up to +30V operation). The card is capable of sourcing up to 500mA using  $V_{EXT}$ .

All channels are software configurable as either inputs or outputs. All output channels can be disabled with a software selectable switch, thus putting all outputs in the open collector state, a quiescent state for minimum power dissipation. The last state of the output is retained in the driver latches so that the same state can appear upon re-enabling.

The P2 connector provides interrupts for four digital input channels. Jumpers on the card allow the user to select high or low transitions on four input channels that trigger an interrupt on a change of state.

The RTI-1287 is a true CMOS design and requires only 30mA under normal operations. It is hardware and software compatible to the 76C04.

### PROGRAMMING

The programming of the RTI-1287 card is very straightforward. The card can be addressed as either successive bytes of memory or a block of I/O ports.

### Address Selection

The RTI-1287 occupies 4 consecutive bytes of address space with a base address of WXYZ which is selected by jumpers. The user may choose to locate the card in either normal, extended memory or I/O space. The base address is determined by on-board jumpers which can be configured to any of the 16k locations in

the 64k of the normal or extended address space. In the I/O port mode of operation, the RTI-1287 occupies 4 consecutive ports in either an 8-bit or 16-bit port image.

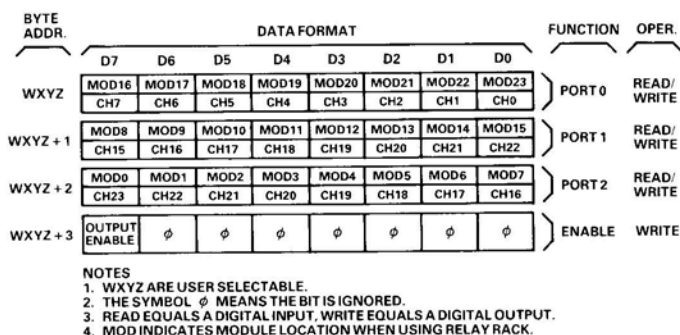


Figure 6. RTI-1287 Memory Map

### Software Operation

In the memory map mode, the RTI card is treated as a block of memory and simple memory read and write instructions can be used. In the I/O port addressing mode simple input and output instructions are used.

The 24 bidirectional digital lines are accessed via three 8-bit I/O bytes. The fourth byte, OUTPUT ENABLE, provides a means to enable or disable all outputs to their quiescent open collector state. All output channels are enabled or disabled by writing to an output bit. When the outputs are disabled during operation, they are in the open collector state, a quiescent state for minimum power consumption. The state of the outputs are retained in latches so that the last state before disabling is available upon re-enable.

### OUTPUT ENABLE

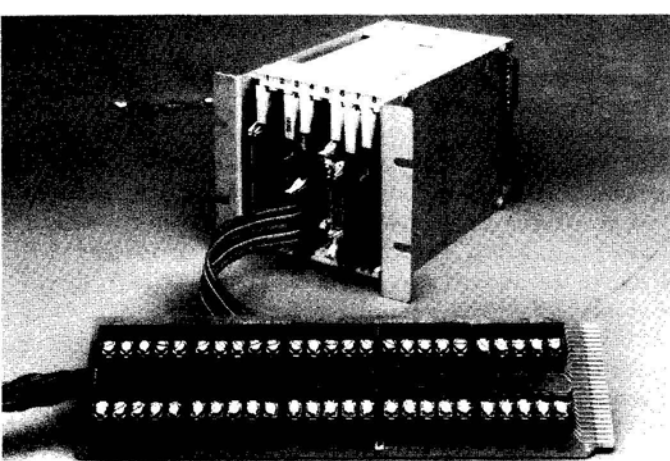
A logic "1" to the OUTPUT ENABLE will disable all output channels which puts all outputs in the open collector state.

### PORT 2,1,0

Each port addresses 8 channels which can be selected to be inputs or outputs.

## ORDERING GUIDE

ADI Model	Description	Used On
<b>Cards</b>		
RTI-1280	Analog Input Card	
RTI-1281	Analog Input/Output Card	
RTI-1282-4	4-Channel Analog Output Card	
RTI-1282-8	8-Channel Analog Output Card	
RTI-1287	Digital Input/Output Card	
<b>Accessories</b>		
OA08	V/I converter provides 4-20mA output from D/A. One required per channel.	RTI-1282-4 (2 max.) RTI-1282-8 (2 max.)
<b>Mating Connectors</b>		
AC1562	34-pin flat cable connector with 3' color-coded cable for analog input and/or output.	RTI-1280 RTI-1281
AC1554	26-pin flat cable connector with 3' color-coded cable for analog output.	RTI-1282-4 RTI-1282-8
AC1806	50-pin flat cable connector with 3' color-coded cable for digital input/output.	RTI-1287
AC1585-8	Interconnection cable for 3B01 signal conditioning backplane (wired to support analog input only).	RTI-1280 RTI-1281
AC1585-7	Interconnection cable for 3B01 signal conditioning backplane (wired to support 4 analog output channel only).	RTI-1282-4 RTI-1282-8
<b>Screw Termination Panels</b>		
AC1585-3	34-pin screw termination panel with 3' ribbon cable compatible to analog connector.	RTI-1280 RTI-1281
AC1585-2	50-pin screw termination panel with 3' ribbon cable compatible to analog connector.	RTI-1282-4 RTI-1282-8
AC1585-4	50-pin screw termination panel with 3' ribbon cable compatible to digital I/O connector.	RTI-1287
<b>User's Manuals*</b>		
AC1517	User's Manual for RTI-1280/1281	
AC1516	User's Manual for RTI-1282	
AC1576	User's Manual for RTI-1287	
NOTE		

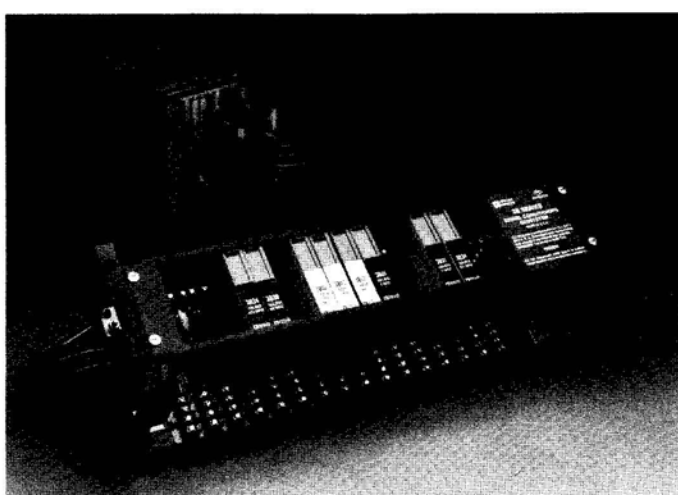


#### **FEATURES**

**Easily Interconnects Analog I/O Cards to Field Wiring**  
**Barrier Strip Screw Terminals**  
**Ribbon Cable Compatible to RTI Cards**

#### **GENERAL DESCRIPTION**

The AC1585 Termination Panel is a printed circuit board which contains screw terminal connectors, provides a one-for-one connection to the RTI cards and comes complete with a 3' ribbon cable which is compatible to analog connector on the RTI.



#### **FEATURES**

**Complete Signal Conditioning Function**  
**Wide Variety of Sensor Inputs**  
**Thermocouples, RTDs, Strain Gage**  
**High Level Output Compatible to RTI Cards**  
**Provides High CMV Isolation and Input Protection**

#### **GENERAL DESCRIPTION**

The 3B Series Signal Conditioning I/O Subsystem provides an easy and convenient solution to signal conditioning problems associated with connecting sensors to an analog card. It is designed to interface directly to sensor or analog signals such as thermocouples, RTDs, strain gages, millivolt or process currents and convert the inputs to high level analog outputs compatible to the RTI analog cards. Features include 220V rms input protection, isolation ( $\pm 1500V$ ), filtering low drift amplification and sensor excitation.

For more information call or write for 3B Series Data Sheet.

### **... NMOS STD BUS PRODUCTS FROM Intronic Power**

#### **RTI-1225**

Low Cost, Analog Input/Output Card  
 16 Input Channels, 10-Bit A/D  
 2 Output Channels, 8-Bit D/A

#### **RTI-1226**

Low Cost, Analog Input Card  
 16 Input Channels, 10-Bit A/D

#### **RTI-1260**

High Performance, Analog Input Card  
 32 Input Channels, 12-Bit A/D

#### **RTI-1262**

High Performance, Analog Output Card  
 4 Output Channels, 12-Bit D/A

#### **RTI-1270**

Sensor Based Data Acquisition Subsystem optimized for temperature and low level signal measurements. Includes sensor signal conditioning ( $\pm 1000V$  isolation), 16-channel analog multiplexing, 13-bit A/D conversion, data manipulation (cold junction compensation, linearization, conversion to engineering units) and maps as a contiguous block of memory onto the STD bus.