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Product Bulletin

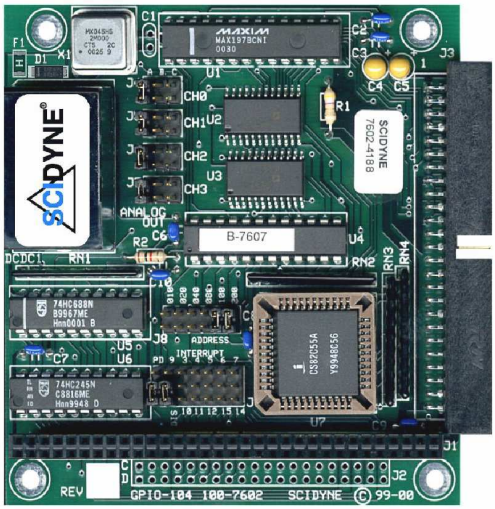
General Purpose I/O Module for PC/104

PB7602

GPIO-104

FEATURES

- Analog I/O and Digital I/O in a single low-cost module
- Eight 12-bit multi-range analog inputs (±10V, ±5V, +5V, +10V)
- Up to 100ksps throughput, self-timed or user-controlled acquisition
- Four 12-bit multi-range analog outputs (±5V, +5V, +10V)
- 24 digital Input/Output channels using familiar 82C55 chip
- Interrupts fully support sharing and access to all PC/104 bus IRQs
- Single +5 volt power requirement



APPLICATIONS

- Industrial Automation and Process Control
- Scientific Apparatus and Instrumentation
- Embedded SCADA Systems
- Automated Test Equipment

PRODUCT DESCRIPTION

The GPIO-104 is an 8-bit analog and digital input/output module designed to satisfy a broad range of applications. Its generous assortment of functions and capabilities will, in many instances, make the GPIO-104 the only peripheral module required. It conforms to the PC/104 (IEEE-996.1) standard, operates on a single +5V power supply, and uses a single 50-Position IDC header for all I/O connections.

Analog Inputs:
Eight 12-bit single-ended analog inputs are provided, each with software programmable input ranges of ±10V, ±5V, +5V, +10V. This capability effectively increases the dynamic range to 14-bits when employing software range-switching techniques. Input protection handles applied voltages up to ±16.5V and continues to function even when power is off. In addition, a fault condition on any input channel will not affect the operation of the remaining channels. A special feature of the analog-to-digital converter is its ability to allow the separate acquisition and conversion times be individually controlled by the user's software or automatically sequenced by the GPIO-104 hardware. Overall timing is precisely maintained by a crystal oscillator. Conversions are initiated by writing a control byte to the converter which configures the input channel and range along with other parameters. The host can determine when the conversion is complete using one of three methods: by simply waiting longer than the conversion time, by polling a status flag or by having the status flag interrupt the host when it becomes set. Throughput up to 100ksps is possible limited only by the speed of the host computer. The resulting 12-bit value is read as two bytes in an 8+4 format.

Analog Outputs:
The four 12-bit analog outputs are individually hardware programmable to provide one of three popular output ranges: ±5V, +5V, +10V. An on-board DC/DC converter enables the bipolar and +10V ranges to be achieved without requiring any additional power supplies. The GPIO-104 includes the capability of having all the outputs update simultaneously by means of a single software write command. Those pre-loaded with new data change, while the remaining channels maintain their previous output voltages glitch-free. This feature is particularly useful in applications which can not tolerate phasing errors between the outputs. The 12-bit data is loaded into the DACs using an 8+4 bit format.

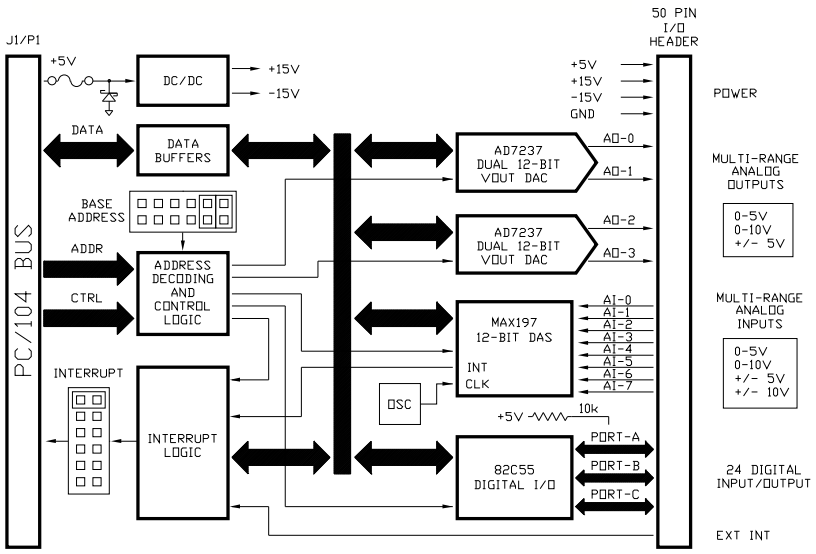
Digital I/O:
An industry standard 82C55 Programmable Peripheral Interface chip provides 24 digital channels across three 8-bit ports. This device offers very flexible configuration, including software programmable port directions and strobed handshaking. Each channel has a 10k pullup resistor and defaults to input mode during system reset.

BENEFITS

System designers are often faced with the challenge of interfacing to a variety of real-world signal types and ranges. This is frequently approached using numerous specific purpose modules, an expensive and often over-featured all-in-one module or designing the electronics from scratch. Rarely do any of these choices provide economic and/or packaging advantages. Alternatively, the GPIO-104 is targeted at satisfying mainstream and cost-sensitive applications by combining the most requested peripherals while offering specifications and capabilities exceeding those of more expensive but less complete solutions.

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Simplified Block Diagram



Input/Output Header Connections

Pin	Description	Pin	Description
1	AGND	2	AI_CH7
3	AGND	4	AI_CH6
5	AGND	6	AI_CH5
7	AGND	8	AI_CH4
9	AGND	10	AI_CH3
11	AGND	12	AI_CH2
13	AGND	14	AI_CH1
15	AGND	16	AI_CH0
17	AO_CH3	18	AO_CH2
19	AO_CH1	20	AO_CH0
21	AGND	22	+15V
23	-15V	24	EXT_INT
25	PA7	26	PA6
27	PA5	28	PA4
29	PA3	30	PA2
31	PA1	32	PA0
33	PB7	34	PB6
35	PB5	36	PB4
37	PB3	38	PB2
39	PB1	40	PB0
41	PC7	42	PC6
43	PC5	44	PC4
45	PC3	46	PC2
47	PC1	48	PC0
49	+5vdc Unfused	50	DGND

SPECIFICATIONS

Analog Inputs:

General:	One MAX197 DAS chip provides eight multi-range single-ended analog input channels
A/D resolution:	12-bit (1 in 4096 of full-scale), 14-bit effective dynamic range using software range-switching techniques
Input ranges:	Each channel has software programmable input range: ±10V, ±5V, +5V or +10V
Input current:	Unipolar: 750µA max. Bipolar: 1200µA max.
Overvoltage:	±16.5V protection. A fault condition on any channel will not affect readings on other channels
Nonlinearity:	±1LSB
Sampling:	100,000 samples/sec max. (Host dependent), self-timed or user controlled acquisition

Analog Outputs:

General:	Two AD7237 chips provide four multi-range analog output channels. Supports simultaneous updates
D/A resolution:	12-bit (1 in 4096 of full scale)
Output ranges:	Each channel has jumper selectable output range: ±5V, +5V or +10V
Output current:	±5mA max. per output
Settling time:	8µs max. to within ±½LSB of final value
Relative accuracy:	±1LSB
Nonlinearity:	Less than ±1LSB, guaranteed monotonic

Digital I/O:

General:	One 82C55 chip provides 24 digital I/O channels across three 8-Bit ports. Supports modes 0, 1 and 2
Compatibility:	TTL/CMOS levels. Each channel is capable of sourcing or sinking 2.5mA, 10k pull-up on each channel

Addressing: 8-bit PC/104 bus. Can be jumpered for any 16 byte block in hosts I/O map, 0x000 through 0x3f0

Interrupt: One interrupt, Jumper selectable IRQ 3, 4, 5, 6, 7, 9, (10, 11, 12, 14, 15)* or Disable. Supports sharing. Used by Analog-to-Digital converter and positive level sensitive external interrupt

Power Requirement: +5Vdc ±5% @ 340mA typical, unloaded outputs

Dimensions: PC/104 compliant, 3.55"W x 3.775"L. 8-bit stack-through, optional 16-bit stack-through

Environmental: Operating temperature: 0°C to 65°C (Standard) Non-condensing relative humidity: 5% to 95%

Ordering Information:

100-7602,	GPIO-104, General Purpose I/O Module for PC/104
104-0025,	Optional 20-Position J2/P2 stack-through connector * Required for upper IRQs
100-7625/50,	IDC-STB/50, 50-Position IDC ribbon cable to Screw-Terminal-Board

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