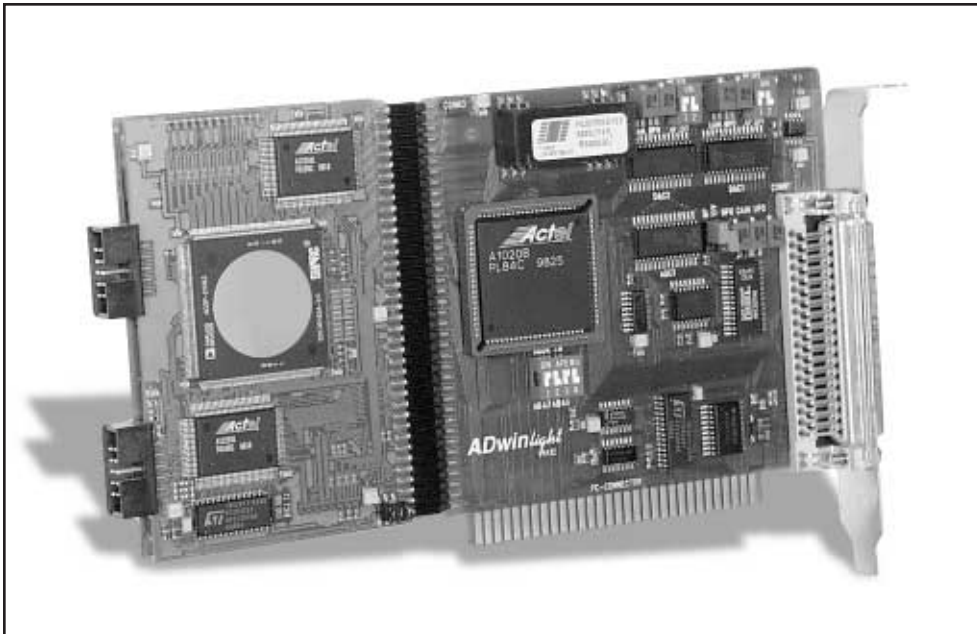


# ADwin-Light

PC Plug-In Board



**Features:**

- 32-bit CPU (SHARC DSP or RISC CPU)
- Four 1MB RAM (up to 32MB)
- 8 differential analog inputs
- 2 analog outputs
- 6 TTL inputs and 6 TTL outputs
- Two 16-bit counters
- 1 Trigger input (Event)
- IRQ or DMA is not required
- Drivers for Windows 95/98/NT/2000 and Linux included

**Functional Description**

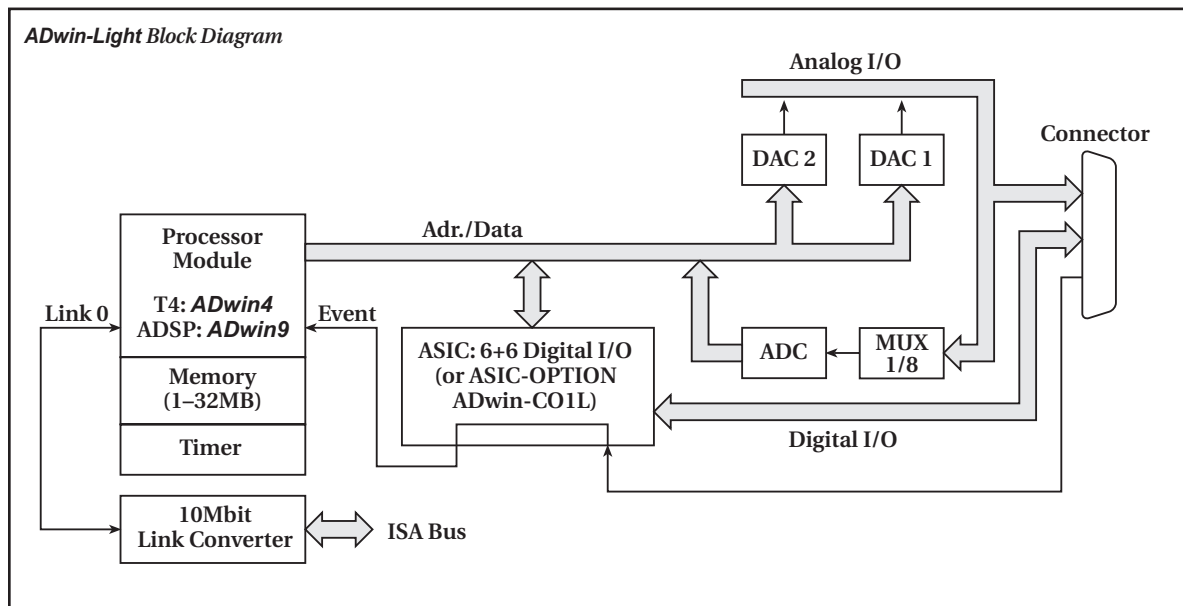
The ADwin-Light board consists of a standard analog and digital I/O board with a plug-on processor module that contains local memory. The ADwin-9L has approximately 20x higher CPU performance than the ADwin-4L.

The 8 analog inputs are differential. There are 2 analog output channels. The digital I/O lines are TTL compatible. The ADwin-Light board provides 2 up counters with a resolution of 16 bits. The counter inputs are shared with digital input pins. The ADwin-Light board is equipped with one 37-pin D-Type female connector. The ADwin-Light board requires one short 8- or 16-bit PC ISA slot.

**QUESTIONS?**

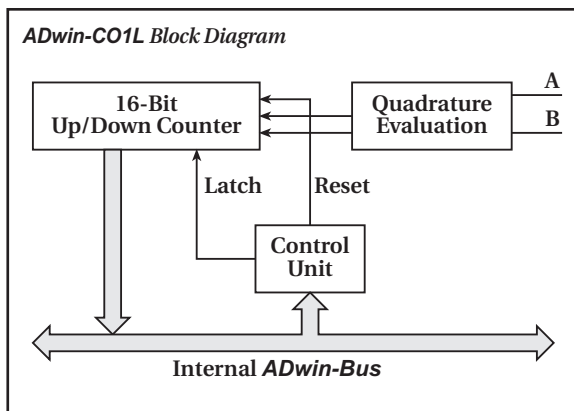
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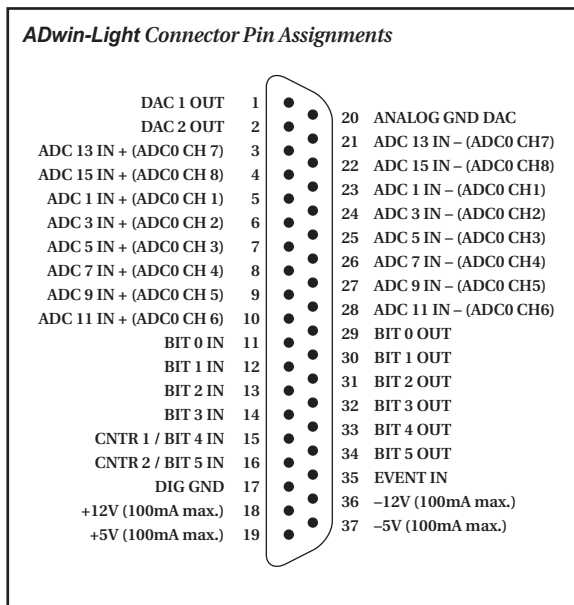
## ADwin-Light

PC Plug-In Board



### Analog Inputs

**CHANNELS:** 8 differential.  
**INPUT RANGE:** 0 to 10V,  $\pm 5V$ ,  $\pm 10V$  (jumper selectable).  
**CONVERSION TIME:** 7.5 $\mu s$ .  
**SAMPLING RATE:** 60kHz max. *ADwin-4L*, 100kHz max. *ADwin-9L*.  
**RESOLUTION:** 12 bit.  
**ERROR:**  $\pm \frac{1}{2}$  LSB.  
**GAIN:** 1 fixed.  
**INPUT RESISTANCE:** 100k $\Omega$ .  
**MAXIMUM OVERVOLTAGE:**  $\pm 35V$  peak.  
**OFFSET AND GAIN ERROR:** Adjustable.  
**OFFSET DRIFT:**  $\pm 30$ ppm/ $^{\circ}C$  of range.  
**ACCURACY:**  $\pm 1$  LSB.



### Options and Accessories for ADwin-Light

#### ADwin-CO1L

The ADwin-CO1L counter option is a 16-bit up/down-counter with a quadrature interface. This counter can be read with one command, allowing the counter values to be acquired simultaneously with analog or digital inputs. The counter has two inputs that are decoded internally with quadrature evaluation logic. The maximum clock rate is 1.25MHz at each input with a maximum internal count rate of 5 MHz. The counter is cleared with a software command. The use of the ADwin-CO1L reduces the number of digital inputs/outputs, and replaces the two standard up counters.

### Analog Outputs

**CHANNELS:** 2.  
**RESOLUTION:** 12 bit.  
**ERROR:**  $\pm \frac{1}{2}$  LSB.  
**VOLTAGE RANGE:** 0 to 10V,  $\pm 5V$ ,  $\pm 10V$  (jumper selectable).  
**OUTPUT CURRENT:** 5mA per channel max..  
**SETTLING TIME:** 10 $\mu s$  to 0.01% error.  
**SHORT CIRCUIT PROTECTION:** Yes.  
**OFFSET AND GAIN ERROR:** Adjustable.  
**OFFSET DRIFT:**  $\pm 10$  $\mu V/^{\circ}C$ .

### Digital I/O

**OUTPUT PORTS:** 6 TTL.  
**INPUT PORTS:** 6 TTL<sup>1</sup>.  
**TRIGGER:** 1 TTL.

### Counter

**NO. OF CHANNELS:** 2 impulse counter<sup>1</sup>.  
**RESOLUTION:** 16 bits.  
**INPUT:** TTL.

### Options

#### ADwin-CO1L<sup>2</sup>.

**EXPANSION BOARDS:** *ADwin-VR6*, *ADwin-CO6*, *ADwin-ADL*, *ADwin-Id*, *ADwin-CAN*.

Processor Modules	ADwin-4L	ADwin-9L
Processor:	T400	ADSP21062
Type:	RISC	DSP
Float / Integer:	- / Yes	Yes / Yes
Bits:	32	32
Clock:	20MHz	40MHz
Performance for calculations: <i>ADwin-9L</i> approx. 20 $\times$ faster than <i>ADwin-4L</i> because of the different CPU structure		
RAM:	1 MB	4 MB
RAM optional:	4, 8 MB	16, 32 MB

<sup>1</sup> Two digital inputs are shared with the counter inputs

<sup>2</sup> Replaces the event counters

### QUESTIONS ?

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# ADwin-Light

PC Plug-In Board

## Expansion Boards

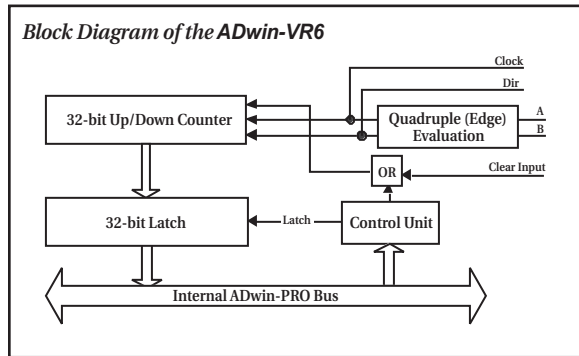
Use the ADwin Series expansion boards to expand I/O capability through the use of a small passive sub-backplane. The expansion boards can also be used to change the I/O configuration of base boards by replacing the existing I/O section of the ADwin board with an expansion board.

### ADwin-VR6 Counter Board

- 6 up/down counters (32 bit)
- Directly connectable to shaft encoders
- Quadrature evaluation or clock/direction inputs

The ADwin-VR6 expansion board provides six 32-bit up/down-counters, a quadrature interface, and latch registers to allow reading during counting. All counters can be latched with one single command simultaneously, or counters can be latched separately.

Each counter has two inputs that are decoded internally in quadrature evaluation logic. The maximum throughput rate is 1.25MHz at each input, A and B, with a maximum internal count rate of 5MHz. Optionally, the counters can also be used with a clock entry and direction entry, with a maximum count rate of 10MHz. Both modes are selectable by software, individually for each counter. The counter is cleared with a positive TTL signal at the clear input or with a software command.



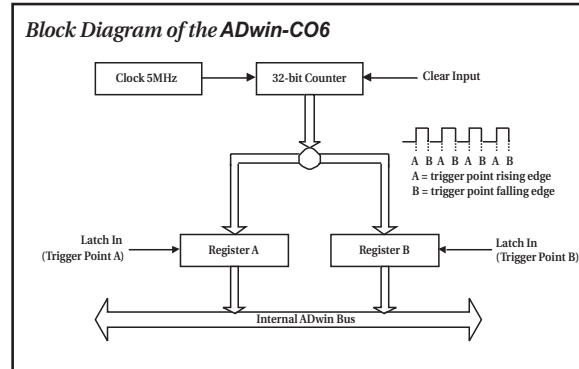
### ADwin-CO6 Counter Board

- 6 counters for measuring pulse width (32 bit)
- 200ns resolution
- Latch registers

The ADwin-CO6 expansion board provides six 32-bit counters, a pulse duration evaluation circuit, and latch registers to read during the count process. All counters can be simultaneously latched with one single command, or the counters can be latched separately.

At each detected rising edge of a TTL pulse, the specified 32-bit counter value is loaded into the high-pulse register. At each detected falling edge of a TTL pulse, the specified 32-bit counter value is loaded into the low-pulse register. The counters can be used to measure the period

time, and the high time and low time of a TTL pulse input. The period, or interval, is the difference between two register values. 0.2ms resolution is achieved by the use of a 5MHz clock. The counters can be cleared with reset entries.



### ADwin-ADL Analog and Digital I/O

- Additional analog and digital I/O
- Channel counts equal to the standard ADwin-Light board (but no additional counters)

The ADwin-ADL is connected via a small backplane to the ADwin-Light board.

### ADwin-ld Digital I/O and Counters

- 44 digital I/O channels (TTL/CMOS)
- Software configurable, in blocks of 4, as input or output
- (4) 16-bit cascadable counters
- Up to 10MHz count rate
- Latch registers
- Trigger input

The ADwin-ld expansion board provides 44 I/O channels. The I/O is software configurable, in blocks of 4, as input or output. The power-up default is "input."

The ADwin-ld also includes (4) 16-bit counters. The counters are cascadable to 32-bit counters. All counters can be loaded into latch registers with a single ADbasic command, so that all counter values can be read simultaneously. It is also possible to latch each counter separately. With a rising edge of a TTL pulse, the specified 16-bit counter increments its value. The counters are cleared by software commands.

### ADwin-CAN CAN-bus Interface Module

The CAN interface expansion board ADwin-CAN provides one CAN interface channel. The interface has 14 FullCAN mailboxes and one BASIC-CAN mailbox, according to CAN Specification 2.0 Part A and Part B. The module provides standard CAN and extended CAN. The signals conform to standard ISO 11898.

# ADwin-Light

PC Plug-In Board

## Specifications of ADwin-Light Options and Expansion Boards

(ADwin-Light options are ASIC upgrades to the base boards, designated at time of purchase.)

	CO1L	VR6	CO6	ld
	Option	Expansion board	Expansion board	Expansion board
Digital I/O	—	—	—	44
Counter Channels	1	6	6	2 / 4
Counter Resolution	16 bit	32 bit	32 bit	32 bit / 16 bit
Counter Type	Up/down with quadrature evaluation	Up/down with quadrature evaluation or clock/direction	Period counter, evaluation of high-time, low-time, PWM	Up counter
Hold Registers	-	6	6 low, 6 high	4
Input Clock Rate	1.25MHz per A,B channel	Quad.eval. per channel A or B: 1.25MHz clk/dir: 10MHz	< 100kHz	10MHz
Comments to Counter	This option replaces the 2 standard counters; counter inputs A and B are shared with 2 digital inputs	1 clear input per channel	5MHz internal measurement clock	Counter inputs shared with 2 (4) digital inputs
Input Type	TTL	TTL	TTL	TTL
Pull-Down Resistor	5.6k	5.6k	5.6k	5.6k
V <sub>IH</sub>	2.4V min.	2.4V min.	2.4V min.	2.4V min.
V <sub>IL</sub>	0.8V max.	0.8V max.	0.8V max.	0.8V max.
Voltage Range	-0.3V to 7V	-0.3V to 7V	-0.3V to 7V	-0.3V to 7V
I <sub>IH</sub>	1mA max.	1mA max.	1mA max.	1mA max.
I <sub>IL</sub>	0.2mA max.	0.2mA max.	0.2mA max.	0.2mA max.

### Ordering Information for ADwin-Light

<b>ADwin-4L</b>	8 analog inputs, 2 analog outputs, 6 digital inputs, 6 digital outputs, 1 trigger input, two 16-bit counters, processor module T400 (32 bit, 20MHz), 1MB RAM
<b>ADwin-9L</b>	8 analog inputs, 2 analog outputs, 6 digital inputs, 6 digital outputs, 1 trigger input, two 16-bit counters, processor module ADSP21062 (32 bit, 40MHz, 256kB local RAM), 4MB DRAM
<b>ADwin-9L-MEM/16</b>	Memory expansion from 4MB to 16MB
<b>ADwin-9L-MEM/32</b>	Memory expansion from 4MB to 32MB
<b>ADwin-CO1L</b>	Counter option with a 16-bit up/down counter
<b>ADwin-LD</b>	Digital expansion board with 44 digital inputs or outputs and two 32-bit or four 16-bit counters respectively
<b>ADwin-ADL</b>	Analog expansion board with 8 analog inputs, 2 analog outputs, 6 digital inputs, 6 digital outputs
<b>ADwin-VR6</b>	6 channels with an encoder input (up/down counters, clock/direction, or quadrature evaluation), 32-bit counters
<b>ADwin-CO6</b>	6 channels for pulse width measuring, period duration and pulse duty factor, digital expansion board, 32-bit counters
<b>ADwin-CAN</b>	Expansion board with CAN-bus interface
<b>Software</b>	
<b>ADbasic</b>	Fast real-time development tool for ADwin boards
<b>ADlab</b>	Driver for measuring, controlling, and monitoring ADwin boards from MATLAB5, Windows 95/98/NT/2000

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