ADwin-Gold

Small External System

General Features

- **32-bit SHARC DSP**
- **4MB RAM**
- **2 x 8 analog inputs @ 2 16-bit ADCs and two fast 12-bit ADCs**
- **2 16-bit analog outputs**
- **32 digital I/O lines (TTL)**
- **1 trigger input (event)**
- **12VDC power for portable applications**
- **Windows 95/98/NT/2000 and Linux drivers included**

Optional Features

- **16MB or 32MB RAM**
- **8 16-bit analog outputs**
- **Isolated digital I/O lines**
- **4 counter, period counter, PWM inputs, encoder inputs**
- **Stand-alone ability with Flash-EPROM**
- **DIN-rail or wall mountable**

Functional Description

The standard ADwin-Gold system has its own DSP (CPU), local memory, 16 analog inputs, 2 analog outputs, 32 digital I/O lines and a trigger input. ADwin-Gold is enclosed in a robust metal enclosure. The system must be connected to a PC or a notebook.

ADwin-Gold CPU

The processor is an Analog Devices–SHARC DSP (Digital Signal Processor) handles system management, data acquisition, online processing and control of outputs. Using a dedicated processor, processing of each measurement can occur immediately after acquisition up to hundreds of kHz. The real-time development tool ADbasic allows programming of mathematical operations and functions, which are executed on the DSP immediately after each sampling step.
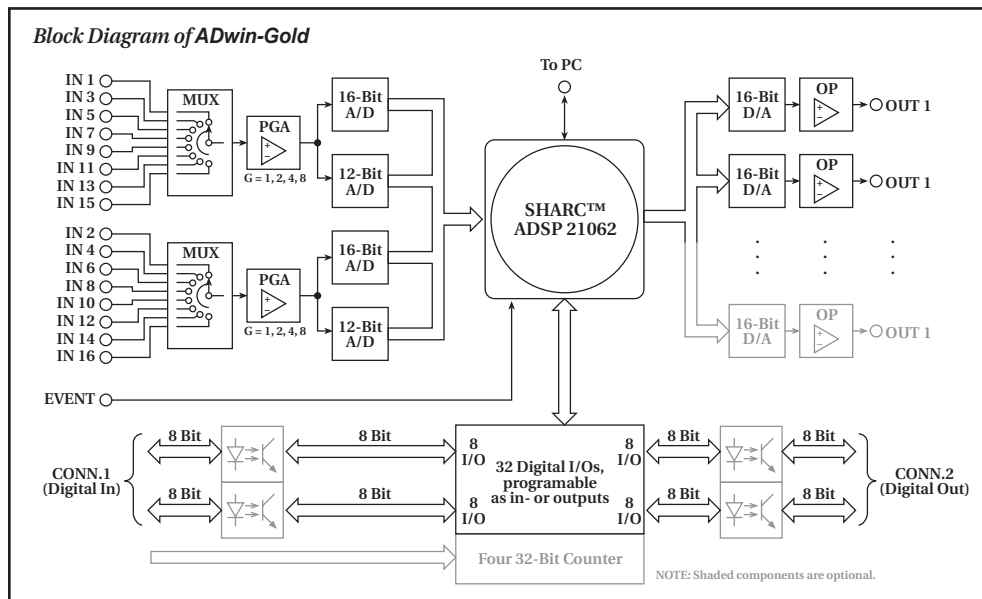
The ADwin-Gold processor also handles the communication between the ADwin system and a PC or a notebook. For this purpose the system is equipped with an serial link (10Mbit/s). Link to the

Block Diagram of *ADwin-Gold*

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PC with a PC plug-in board (ADlink) or with a PCMCIA adapter (ADpcmcia) for notebook computers. Distances of up to 20 meters are supported. The included cable has a length of 2m.

Analog Inputs

ADwin-Gold has 16 analog inputs. There are 2 input blocks with 8 analog inputs each. These 8 inputs are connected to a multiplexer. The output of each multiplexer is connected with 2 different ADCs: one 12-bit ADC (0.8µs) and one 16-bit ADC (10µs). Consequently, it is possible to execute very fast measurements with the 12-bit ADCs or highly accurate measurements with the 16-bit ADCs. The ADCs can be started in synchronous or asynchronous mode, which means that they can acquire measurement data on 2 channels simultaneously.

The analog inputs can be operated in either single-ended or differential (default setting on delivery) modes. Jumpers set the input mode. In order to reduce interference, all analog inputs have BNC connectors. It is recommended that insulating shell BNC connecting cables be used for safety.

Analog Outputs

The standard version of the ADwin-Gold system is equipped with two analog outputs with 16-bit resolution. The settling time for low-level signals (<2V) is 3µs. The setting time for the full range (20V) is 10µs. Optionally, an expansion to eight DACs is possible.

The output of the signal can be started on all DACs at the same time. They have a second buffer for latching, so that with only one instruction updated values can be output on all DACs at the same time.

Digital I/O and Trigger Input

ADwin-Gold has 32 user-defined, TTL-compatible digital inputs and outputs, as well as a trigger input (event). After turning on the supply voltage, all I/O connectors are inputs. They can be configured as inputs or outputs in groups of eight. The digital inputs and outputs can be accessed with 16-bit words. The trigger input is used for the external control of program sequences.

Options and Accessories for ADwin-Gold

Memory Options:
ADwin-G-MEM/16, ADwin-G-MEM/16

The ADwin-Gold system can be optionally equipped with the DRAM ADwin-G-MEM/16 (16MByte) or ADwin-G-MEM (32MByte).

Power Supply: ADwin-Gold-POW

The ADwin-Gold system needs an external supply voltage of 12V (10 to 18V@ 2A max.) The ADwin-Gold system is powered by 12V, for example with a car battery. This makes it an ideal portable solution. If the ADwin-Gold system will be operated together with a PC, the system can get its power by using the power connector of the link adapter.

By using the system with the PCMCIA, USB, or Ethernet interface, the system has to be supplied with an external power supply.

ADwin-Gold-DA

The analog output expansion ADwin-Gold-DA for the ADwin-Gold system is equipped with six analog outputs with 16-bit resolution. The settling time for low-level signals (<2V) is 3µs. For the full range (20V) it is 10µs.

The output of the signal can be started on all DACs at the same time. They each have a second buffer for latching, so that with only one instruction updated values can be output on all DACs at the same time.

With ADwin-Gold-DA, the ADwin-Gold system has 8 analog outputs. The first four DACs connect to BNC outputs. The second four DACs connect to D-type outputs.

ADwin-Gold-opt

The ADwin-Gold system can be expanded with optically isolated digital I/O lines. By using the expansion ADwin-Gold-opt the I/O lines are fixed configured as 16 inputs and 16 outputs.

This expansion provides 16 channels of optically isolated digital inputs. The input voltage range can be set by jumpers (5V, 12V, 24V). The default setting of the input voltage range is 24V. The 200ns switching time allows the sampling of high-speed digital inputs. Each channel is optically isolated from the system circuitry. The event input (trigger input) is optically isolated from the system as well.

This expansion also provides 16 channels of isolated transistor outputs. The supply voltage (VCC) has to be provided by an external power supply. The channels are isolated from system circuitry.

ADwin-Gold-CO1

The ADwin-Gold system can be expanded with counter functionality by using the ADwin-Gold-CO1 option. This option offers 4 flexible counters that can be individually configured as:

- up counter
- period counter
- up/down counter (encoder inputs or clock/dir)
- PWM inputs (two channels)

Because it is a factory option, the standard ADwin-Gold system is delivered with no expansion board, but with a differently programmed ASIC.

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ADwin-Gold-Boot

The program loading and monitoring module allows stand-alone operations without a PC. After power up, this module boots the system, downloads programs to ADwin-Gold, and starts the desired processes.

ADwin-Gold-USB

To run an ADwin-Gold system via a USB (Universal Serial Bus) interface, there is a USB converter module ADwin-Gold-USB. This module converts the link interface to a standard USB interface. ADwin-Gold-USB supports standard USB functionality such as hot plug & play. The maximum cable length is up to 5m (USB specification, expandable with hubs). The USB interface can be used under Windows 98 and 2000, and also with the OSR2 version of Windows 95 (with USB driver pack).

All ADwin systems support a USB driver. This driver also supports USB-based ADwin systems with PC programs (such as user interfaces) which were developed for link-based systems. The driver converts the communication flow automatically. There is absolutely no need to adapt existing PC programs. *Please call for availability.*

ADwin-Gold-ENET

To run an ADwin-Gold system via Ethernet (TCP/IP protocol) there is a converter module ADwin-Gold-ENET. This Ethernet interface can be used with all network devices which support a TCP/IP protocol (for example, Windows PCs, MACs, Linux PCs, workstations, etc.). *Please call for availability.*
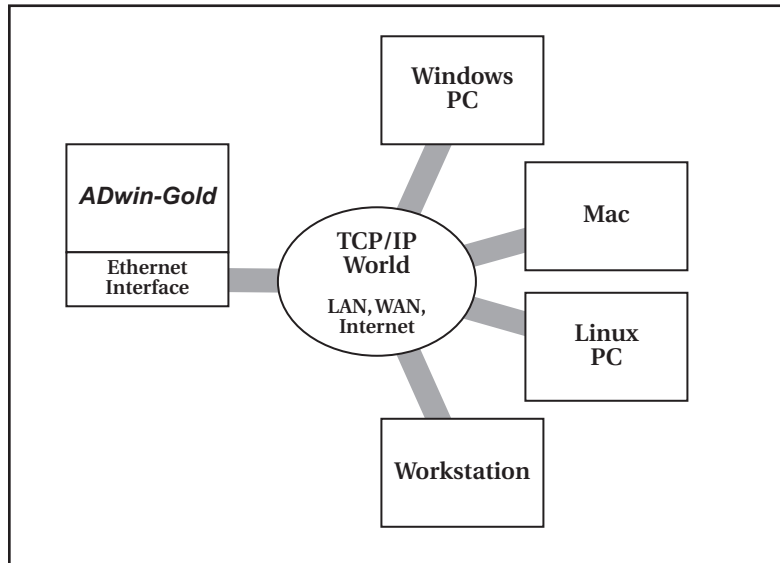
RS-232, -485; CAN-Bus; Profibus: *Please call for availability.*

Analog Inputs

INPUT CHANNELS: Two sets of 8 differential inputs (via multiplexer), separately switchable to single-ended mode.

	12 bit	16 bit
RESOLUTION:	12 bit	16 bit
CONVERSION TIME:	0.8μs	10μs
MULTIPLEXER SETTLING TIME:	1μs	4μs
ACCURACY:	±1 LSB	±2 LSB

MEASUREMENT RANGES: ±10V.
INPUT RESISTANCE: 330kΩ.
MAXIMUM OVERVOLTAGE: ±35V.
DIFFERENTIAL COMMON MODE VOLTAGE: ±2.5V max.
OFFSET ERROR: Adjustable.
OFFSET DRIFT: ±30ppm/°C.
CHANNEL ASSIGNMENT ADC-12-1/ADC-16-1: 1, 3, 5, 7, 9, 11, 13, 15.
CHANNEL ASSIGNMENT ADC-12-2/ADC-16-2: 2, 4, 6, 8, 10, 12, 14, 16.
CONNECTORS: BNC sockets.

Analog Outputs

OUTPUT CHANNELS: 2 (optional up to 8).
RESOLUTION: 16 bit.
VOLTAGE RANGES: ±10V.
OUTPUT CURRENT: 5mA/channel max.
DIFFERENTIAL NON-LINEARITY: ±1 LSB.
RELATIVE ACCURACY: ±2 LSB.
OFFSET DRIFT: ±10mV/°C.
GAIN ERROR: Adjustable.
SETTLING TIME: Low-level signal change <2V: 3μs.
                      The whole range of 20V: 10μs.
CONNECTORS: BNC sockets or D-type sockets (optional).

Digital Inputs and Outputs

DIGITAL I/O LINES: 32 (pos. TTL logic) programmable as inputs or outputs in groups of 8.
OPTICAL ISOLATION: Optional.
OUTPUT CURRENT: 10mA per channel max.
TRIGGER INPUT: 1 (pos. TTL logic).
INPUT RESISTANCE: 1MΩ.
CONNECTORS: D-type socket/25-pin connector.

Processor

TYPE/MANUFACTURER: SHARC DSP ADSP 21062 (Analog Devices).
REGISTER WIDTH: 32 bit.
CLOCK RATE: 40MHz.
MEMORY: 4MB (optional 16MB or 32MB) D-RAM.

GENERAL FEATURES

POWER SUPPLY: +12V (10 to 18V) / 1.1A (or for a short time 2A max.).
OPERATING TEMPERATURE: 0°C to +70°C (temperature of chassis).
STORAGE TEMPERATURE: –20°C to +70°C.
RELATIVE HUMIDITY: 0–90%, no condensation.
WEIGHT: Approx. 1350g.
DIMENSIONS (W × H × D): 214mm × 108mm × 56mm.
MOUNTING: Desk-top unit. Optional: DIN rail or wall mounting.
I/O PORT ASSIGNMENT: Base address adjustable at the link adapter.
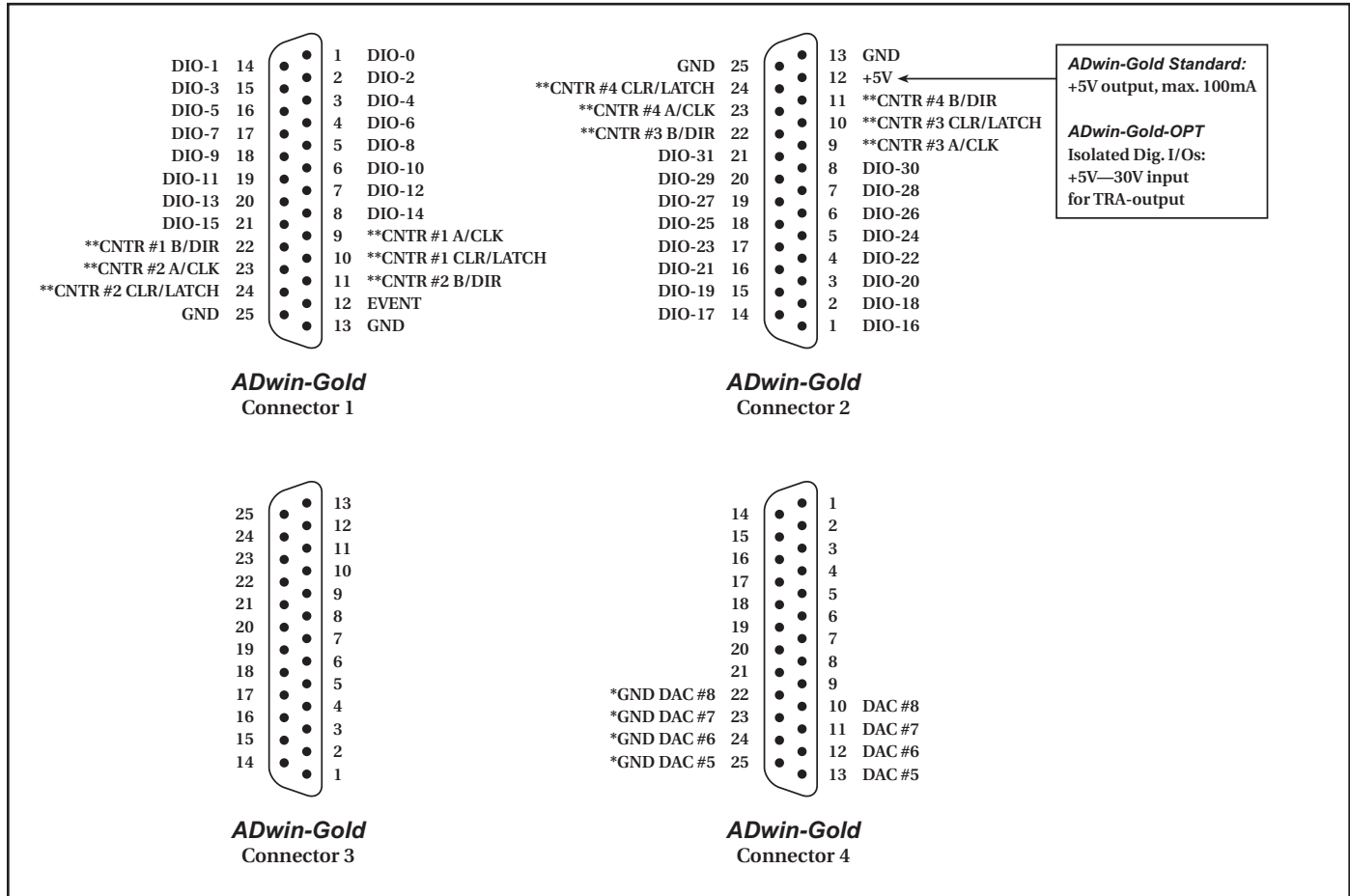**NECESSARY INTERRUPTS:** None.
NECESSARY DMA CHANNELS: None.

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Connector Pin Assignments

DIO-1	14	1	DIO-0
DIO-3	15	2	DIO-2
DIO-5	16	3	DIO-4
DIO-7	17	4	DIO-6
DIO-9	18	5	DIO-8
DIO-11	19	6	DIO-10
DIO-13	20	7	DIO-12
DIO-15	21	8	DIO-14
**CNTR #1 B/DIR	22	9	**CNTR #1 A/CLK
**CNTR #2 A/CLK	23	10	**CNTR #1 CLR/LATCH
**CNTR #2 CLR/LATCH	24	11	**CNTR #2 B/DIR
GND	25	12	EVENT
		13	GND

ADwin-Gold
Connector 1

GND	25	13	GND
**CNTR #4 CLR/LATCH	24	12	+5V
**CNTR #4 A/CLK	23	11	**CNTR #4 B/DIR
**CNTR #3 B/DIR	22	10	**CNTR #3 CLR/LATCH
DIO-31	21	9	**CNTR #3 A/CLK
DIO-29	20	8	DIO-30
DIO-27	19	7	DIO-28
DIO-25	18	6	DIO-26
DIO-23	17	5	DIO-24
DIO-21	16	4	DIO-22
DIO-19	15	3	DIO-20
DIO-17	14	2	DIO-18
		1	DIO-16

ADwin-Gold
Connector 2

ADwin-Gold Standard:
+5V output, max. 100mA

ADwin-Gold-OPT
Isolated Dig. I/Os:
+5V—30V input
for TRA-output

25	13	
24	12	
23	11	
22	10	
21	9	
20	8	
19	7	
18	6	
17	5	
16	4	
15	3	
14	2	
	1	

ADwin-Gold
Connector 3

	14	1	
	15	2	
	16	3	
	17	4	
	18	5	
	19	6	
	20	7	
	21	8	
		9	
*GND DAC #8	22	10	DAC #8
*GND DAC #7	23	11	DAC #7
*GND DAC #6	24	12	DAC #6
*GND DAC #5	25	13	DAC #5

ADwin-Gold
Connector 4

Ordering Information for *ADwin-Gold*

ADwin-Gold	Standard system
ADwin-Gold-DA	Expansion with 6 analog outputs (16 bit)
ADwin-Gold-opt	Isolation of the digital inputs/outputs
ADwin-Gold-DA/opt	Combination of ADwin-Gold-DA and ADwin-Gold-opt
ADwin-G-MEM/16	Memory expansion from 4MB to 16MB
ADwin-G-MEM/32	Memory expansion from 4MB to 32MB
ADpcmcia	PCMCIA link adapter with 2m link cable
ADwin-Gold-pow	Power supply device (12VDC) for ADwin-Gold
Gold-Mount	DIN rail installation
Gold-cable-5	Link and power supply cables (5m)
Gold-cable-10	Link and power supply cables (10m)
Gold-cable-15	Link and power supply cables (15m)
Gold-cable-20	Link and power supply cables (20m)
ADwin-Gold-USB	Link to USB interface
ADwin-Gold-ENET	Link to Ethernet interface
ADwin-Gold-Boot	Flash-EPROM boot loader

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