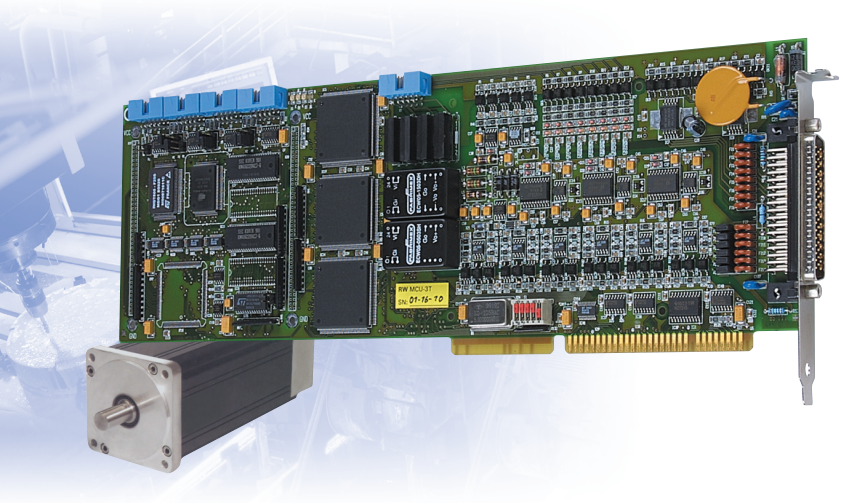
Intelligent isolated positioning and motion control board



PA 8000

For 3 axes

Mixed operating of servo or stepper motors possible

D/A converter 16-bit

Optical isolation

Cascadable up to 18 axes

Menu-driven test applications

The PA 8000 is an intelligent board designed for controlling and positioning up to 3 servo or stepper motor axes in machine tools, robots or special-purpose machines.
The use of CNC programs allows to define parameters and to automate motions. The control can execute position, linear and circular interpolations.
The PA 8000 has three analog channels with an output range of ± 10 V and 16-bit resolution. They are isolated from the digital voltage supply of the PA 8000 (PC voltage supply) and are used for controlling commercially available power amplifiers connected as speed controlling devices or speed regulators.
Three stepper and directional signals with a control voltage of 5V (RS422) are available for controlling stepper motor power amplifiers.
Three pulse acquisition channels are used for position acquisition with incremental encoders or SSI absolute encoders. The pulse acquisition is made either with TTL encoders or with encoders with symmetrical outputs (RS-422). These lines are also optically isolated. The actual position of the measuring system can be stored in a register using a zero pulse or a digital input. Such measuring methods allow for easy encoder verification, setting of reference marks or real-time position latching with measuring machines.
The PA 8000 allows the connection of 16 optically isolated inputs and 8 optically isolated outputs used for functions such as end switch, reference switch, release of power amplifiers. All input and output channels which are not used with these functions can be freely programmed.
The board can be programmed in two different ways: the PC and the stand-alone programming. Up to four stand-alone programs can be executed simultaneously.
Several PA 8000 boards can be cascaded to a multi-axis system. Customised slave board options are also available (additional digital I/O, 4 analog I/O, connection to Interbus S).

Features

Hardware

- Intelligent board based on a 32-bit RISC processor
- Positioning of 3 axes either with servo or stepper motors; mixed operating of servo and stepper motors possible
- For all commercially available power amplifiers
- Linear, circular and CAD interpolation
- Point-to-point movements are possible with independent control of each axis
- All inputs and outputs are isolated from the PC voltage supply
- Several PA 8000 boards can be cascaded to a multi-axis system of maximum 18 axes

Software

- Function library for Pascal and C
- Programming through a PC application program or as stand-alone system
- The operating program can be easily adapted to specific requirement
- User programs created with the efficient compiler can be processed automatically
- Multi-task mode: the board can simultaneously process up to 4 user programs.

EMC tested according to 89/336/EEC

- IEC 61326: electrical equipment for measurement, control and laboratory use

Applications

- Event counting
- Axis control
- Robotics
- X-Y-Z position control
- Stepper motor control
- Machine controllers
- Research and development

Software drivers

A CD-ROM with the following software drivers and programming examples is supplied with the board.

Standard drivers and samples for:
Windows NT/98/95, Windows 3.11, MS-DOS

Current list on the web www.addi-data.com

www.addi-data.com
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PA 8000

Specifications

CPU system:	32-bit RISC processor 25 MHz
RAM:	4 MB
Data exchange with the PC:	Through serial high-speed links
Cycle time:	1.28 ms for all 3 axes (control and interpolation)
Word length:	32 bits with sign
Controller software:	PIDF (PID controller with compensation)
Interpolation:	2D .. 3D linear, 2D circular, 3D asynchronous and synchronous interpolation with secondary axes
Inputs for incremental encoders:	Diff. or TTL, max. 5 MHz (20 MHz after quadrupling)
Inputs for SSI encoders:	Up to 32-bit, gray/binary code variable frequency 30 kHz - 5 MHz
Setpoint value outputs (servo):	1 per channel, D/A converter, 14 (16) bit resolution, ± 10 V
Pulse outputs:	1 stepper signal (RS422) and 1 directional signal (RS422) for each channel, pulse frequency up to 1 MHz
Isolated digital input channels:	16 inputs, 24 V, as end or reference switch or freely programmable
Isolated digital output channels:	8 outputs, 24 V/500 mA, for releasing power amplifiers or freely programmable
Interrupts:	IRQ 3, 5, 11 and 15
Auxiliary voltage:	External 24 V for digital I/O
Safety output:	Watchdog relay

Safety features

Optical isolation:	1000 V

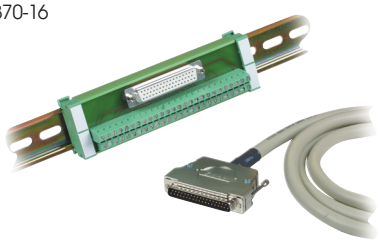
Noise immunity

Test level:	- ESD: 4 kV - Fields: 10 V/m - Burst: 4 kV - Conducted radio interferences: 10 V

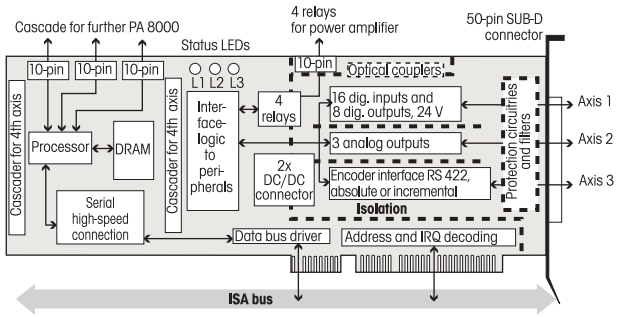
Physical and environmental conditions

Dimensions:	338 x 110 mm
System bus:	ISA
Space required:	Long board, 1 AT slot. With OPAD, one slot opening is necessary for the connector of ribbon cable FB8000
Operating voltage:	+5 V, ± 5 % from the PC
Front connector:	50-pin SUB-D male connector
Temperature range:	0 to 60°C (with forced cooling)

Terminal board PX 8000
with cable ST370-16



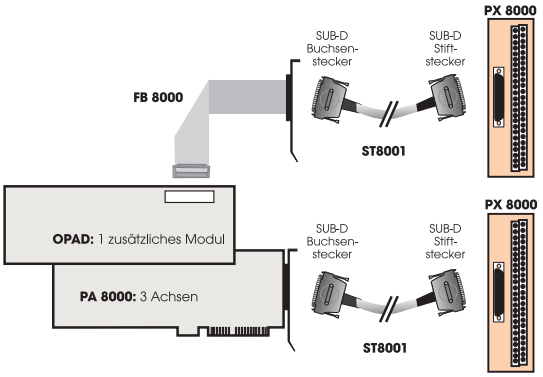
Simplified block diagram



Pin assignment – 50-pin SUB-D male connector

Pin		Pin		Pin		Pin	
17	+ 24 V	33	Dig. output 8	17		50	0 V ext. for dig. I/O
16	Dig. input 8	32	Dig. output 7	16		49	Dig. input 16
15	Dig. input 7	31	Dig. output 6	15		48	Dig. input 15
14	Dig. input 6	30	Dig. output 5	14		47	Dig. input 14
13	Dig. input 5	29	Dig. output 4	13		46	Dig. input 13
12	Dig. input 4	28	Dig. output 3	12		45	Dig. input 12
11	Dig. input 3	27	Dig. output 2	11		44	Dig. input 11
10	Dig. input 2	26	Dig. output 1	10		43	Dig. input 10
9	Dig. input 1	25	Set value: value 2/step 2	9		42	Dig. input 9
8	Set value: value 1/step 1	24	Set value: value 2/step 2	8		41	Set value: value 3/step 3
7	Set value: value 1/step 1	23	True value 2	7		40	Set value: value 3/step 3
6	True value 1	22	True value 2	6		39	True value 3
5	True value 1	21	True value 2	5		38	True value 3
4	True value1	20	True value 2	4		37	True value 3
3	True value 1	19	Setpoint value 2/step 2	3		36	True value 3
2	Setpoint value 1/step 1	18	Setpoint value 2/step 2	2		35	Setpoint value 3 /step 3
1	Setpoint value 1/step 1			1		34	Setpoint value 3 /step 3

ADDI-DATA connection



ORDERING INFORMATION

ADDIPOS PA 8000

PA 8000: Intelligent positioning and axis control board. Incl. technical description and software drivers.

Versionen

PA 8000: For servo and stepper motors
PA 8000-STE: For stepper motors

Zubehör

OPAD: An additional axis on the PA 8000
OPAD-STE: An additional axis on the PA 8000-STE
FB8000: Ribbon cable between OPAD(-STE) and a 50-pin SUB-D male connector with bracket

Connection

PX 8000: Screw terminal board with housing for DIN rail
ST8001: Cable for connecting APCI-8001 and OPMF, 50-pin

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