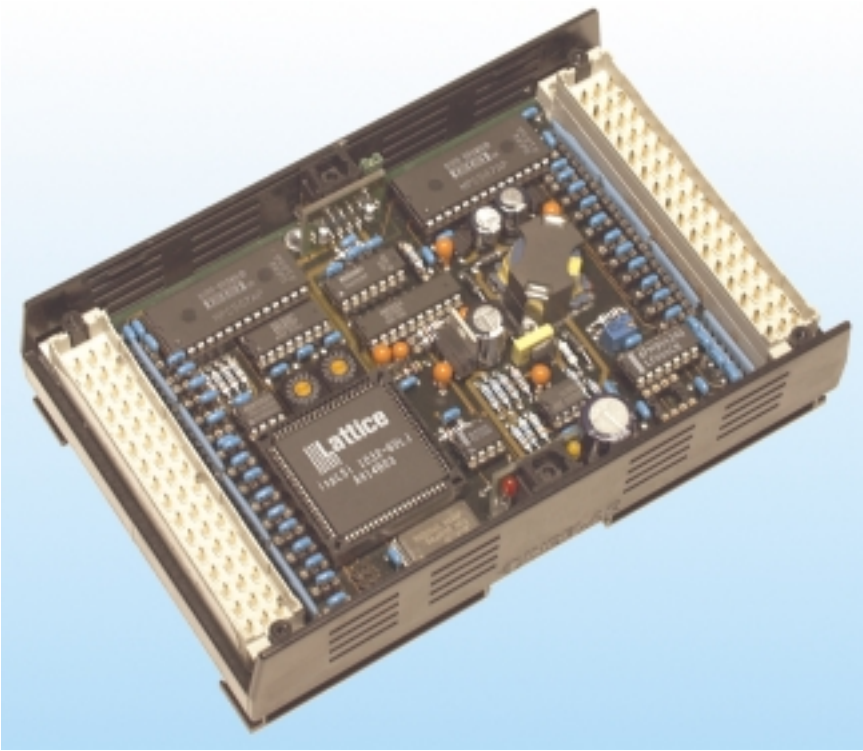
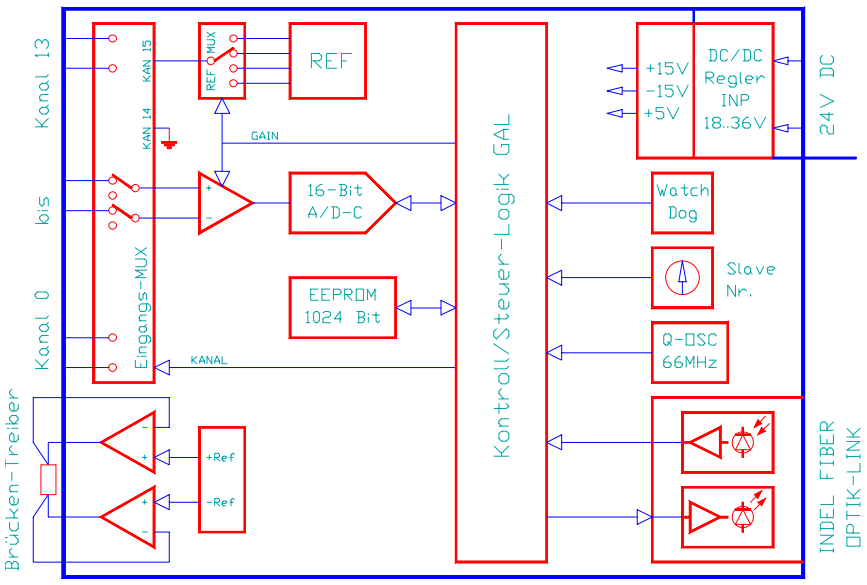
Fast Analog/Digital Converter

INFO-FADC



Measurement of Dynamic Processes

The INFO-FADC board (Fast Analog/ Digital Converter) is the measurement element for the registration of fast and dynamic processes.
Up to 14 currents or voltages can be measured by one FADC board.
The standard firmware measures 2 channels per millisecond.
Four precision voltage sources, whose characteristics have been saved in the on-board EEPROM, are incorporated for automatic zero point and full-scale alignment. The operating system automatically corrects offset and gain drift for all measurement values with reference measurements and the EEPROM data .
This provides high-precision measurement values at all times, even in the presence of wide temperature fluctuations in the environment.



Technical Data

Measurement channels
- 14 analog measurement channels
- Four measurement ranges: ±10V, ±1V, ±0.1V, ±0.01V

Resolution
- Resolution: 16Bit, 1/65,000 of the measurement range.

Conversion time
- Standard: 500µs
- User-specific: 20µs

2 bridge drivers
- Range: ± 10V controlled
- Other ranges possible

Reference
- Automatic alignment of zero point and full scale

Filtering
- Adjustable 50/60Hz filter

15V power supply
- Additional 15V power supply

Board power supply
- Electrically isolated
- Power supply 18 ... 36V, 140mA max.

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Rev. 0006

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Mode of Operation

The INFO-Fast-ADC board has been developed for the measurement of fast and dynamic processes. It measures voltages with a standard conversion time of 500µs and a measurement resolution of 16 bit, with the last two bits only being meaningful when several measurement values are averaged.
User-specific conversion times up to 10µs are available (special firmware). The input range can be set by a software function to ±10V, ±1V, ±0.1V or ±0.01V.

For measurement signals exposed to power supply interference, a software-implemented line filter (50 and 60Hz) exists. Note in this connection that the refresh time of the measurement data is increased to half the power supply period. (Instead of 8.333ms period duration at 60Hz, 8ms will be measured.)

The entire measurement handling and the transmission of the measurement values is done by the firmware in the INFO-Master. The user obtains the offset and full-scale-corrected measurement values directly in the unit of measurement mV or V and in the required format (fixed or floating point). The mode of operation of the Fast-ADC board can be controlled across a special range in the Dualport RAM.

The channels 15 and 16 are provided with high-precision reference voltage sources. In operation, the INFO-Master automatically includes them in the measurement and thereby corrects the offset and gain drift.
All alignments have been made during quality checking at INDEL. The values are saved in an on-board EEPROM. The board does not have any potentiometers; there is nothing to align or vary!

Connector Allocations

Connector 1

vertical
DIN 41612, Type F-48
2.8mm pins

	d			b			z	
2	I	+ V 8		I	+ V 8		Shield	
4	I	- V 8		I	- V 8		Shield	
6	I	+ V 9		I	+ V 9		Shield	
8	I	- V 9		I	- V 9		Shield	
10	I	+ V A		I	+ V A		Shield	
12	I	- V A		I	- V A		Shield	
14	I	+ V B		I	+ V B		Shield	
16	I	- V B		I	- V B		Shield	
18	I	+ V C		I	+ V C		Shield	
20	I	- V C		I	- V C		- 15 V	
22	I	+ V D		I	+ V D		+ 15 V	
24	I	- V D		I	- V D		Shield	
26		GND		I	+ Sense 0	I	+ Sense 1	
28		GND		O	+ Vout 0	O	+ Vout 1	
30		+ 24 V		O	- Vout 0	O	- Vout 1	
32		+ 24 V		I	- Sense 0	I	- Sense 1	

Connector 2

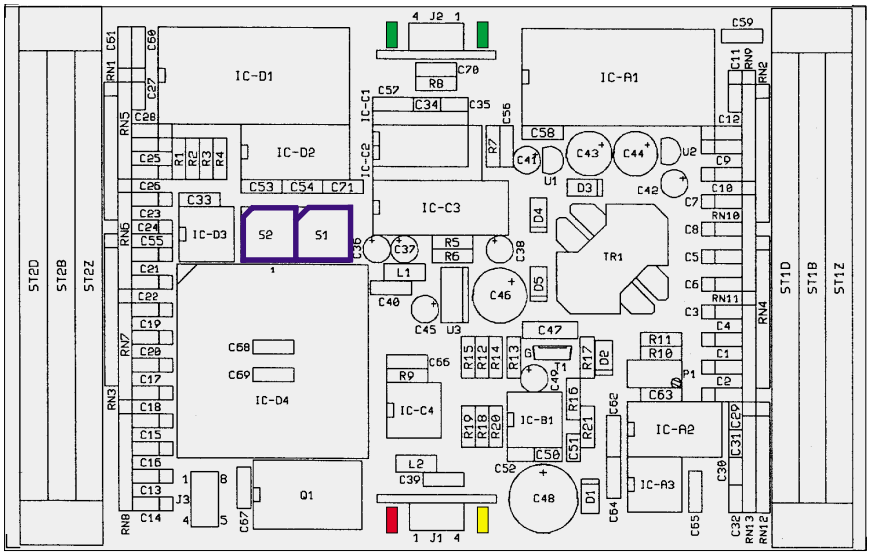
vertical
DIN 41612, Type F-48
2.8mm pins

	d		b		z	
2	Shield	I	+ V 0	I	+ V 0	
4	Shield	I	- V 0	I	- V 0	
6	Shield	I	+ V 1	I	+ V 1	
8	Shield	I	- V 1	I	- V 1	
10	Shield	I	+ V 2	I	+ V 2	
12	Shield	I	- V 2	I	- V 2	
14	Shield	I	+ V 3	I	+ V 3	
16	Shield	I	- V 3	I	- V 3	
18	Shield	I	+ V 4	I	+ V 4	
20	Shield	I	- V 4	I	- V 4	
22	Shield	I	+ V 5	I	+ V 5	
24	Shield	I	- V 5	I	- V 5	
26	Shield	I	+ V 6	I	+ V 6	
28	Shield	I	- V 6	I	- V 6	
30	Shield	I	+ V 7	I	+ V 7	
32	Shield	I	- V 7	I	- V 7	

Fast Analog/Digital Converter

INFO-FADC

Assembly



Addressing (blue)

S2 (X0)	S1 (0Y)	Measurement board
0	0	0
...	...	...
0	F	15
1	0	16

Jumpers (green)

The jumpers influence the illumination intensity of the emitting LED and thereby the segment length of the fiberoptic cable to the next board.

Segment length	Jumper position
0 ... 10m	no jumper
8 ... 30m	>10
20 ... 50m	>30

LEDs on receiver module

LED-red = +5V power supply
LED-yellow = INFO-Link receiver signal OK

15V power supply

- 15V ±10%, 100mA max.

Mounting

- Connector DIN 41612, Type F-48
- Mounting on 35mm DIN bar
- 105 x 165 x 45mm (WxDxH)

Customized modifications are available as needed.

Specifications

Board power supply

+18 ... 36V, 140mA

Climatic conditions

- Ambient temperature:
  Storage: -20...+80°C
  Operation: 0 ... +45°C
- Board temperature:
  Operation: 0...+70 °C
- Relative air humidity
  no condensation: 95%

Measurement ranges, resolution

- 14 independent msmt. channels
  The resolution of 16 bit can only be achieved if the measurement value is averaged across several measurements.
  Otherwise the resolution is 14 bit.

Range	16Bit ; 14Bit
- ± 10V	300 ; 1,200µV
- ± 1V	30 ; 120µV
- ± 0,1V	3 ; 12µV
- ± 0.01mV	0.3 ; 1.2µV

Measurement time

- Autorange can be software-implemented
- As standard, 500µs conversion time per channel
- User-specific up to 20µs

Precision and drift

- <0.02% of the measurement range at 25 degrees ambient temperature
- Drift: 30ppm/degree change in ambient temperature

Warm-up time

- The optimal stability of the measurement values is reached after 5min operating time .

Power supply interference

- Line filter: 50/60Hz adjustable
  The refresh time of the measurement values is increased by filtering to half the power supply period.

Bridge driver

- Controlled bridge driver ±10V for measurement bridges.

Connection

- Differential inputs

Connections

Board power supply

For the board power supply, a 3-phase rectifier without electrolytic capacitor will suffice. But to prevent interference, an electrolytic capacitor of 4,700 ... 10,000µF is recommended. The 24V power supply must pass through a line filter.

Shielded lines

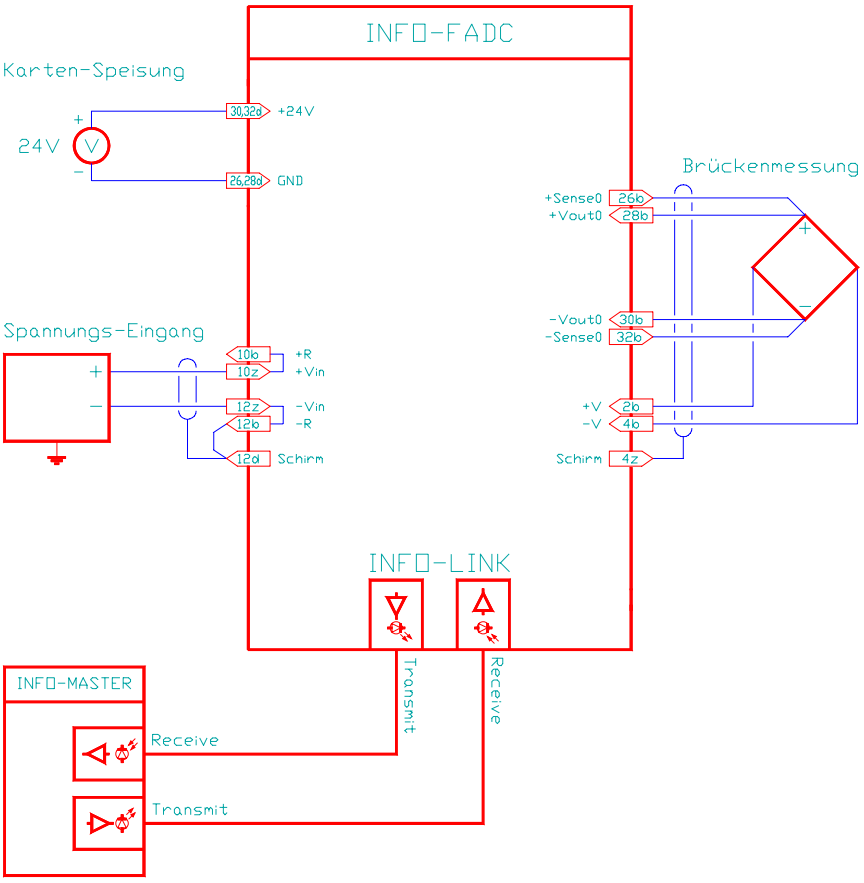
All analog signal lines must be shielded. The shield must be connected at both ends.
In order to prevent undesired leakage currents through the shield, it may be necessary to provide a bonding conductor, especially in case of large distances.

Grounding

The INFO-FADC is grounded through the housing. Make sure that the mounting bar has very good contact with the mounting plate or the chassis to allow interference to be discharged.

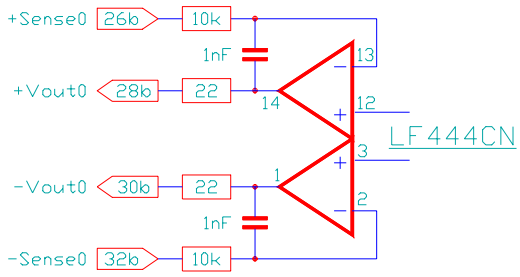
See also INDEL Wiring Guidelines and INDEL Design Guidelines.

Connection Example

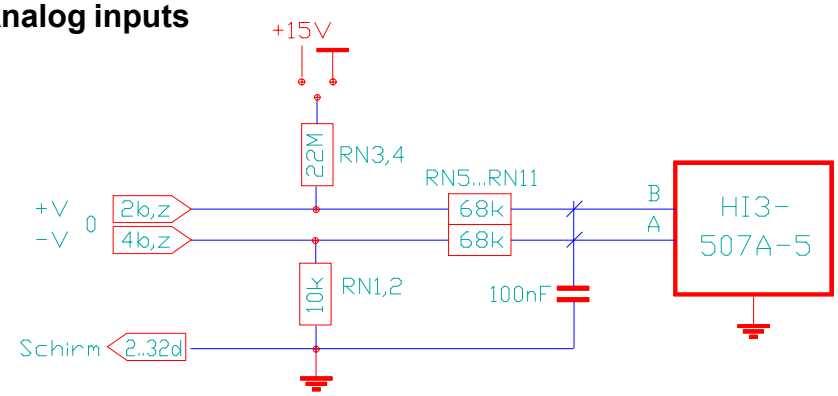


Interfaces

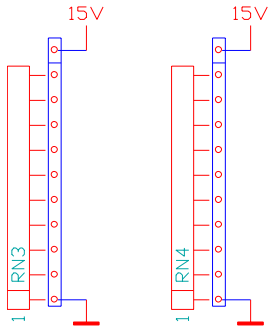
Bridge driver



Analog inputs



Resistor array assembly



Input lines ±V wired to Gnd.

Wiring

Bridge driver

For pressure, proportioning, strain gauges and other measurement bridges, two controlled bridge drivers ±10V are available.
Other voltages are available upon request.

Inputs

Wiring of the analog inputs.
The plug-in resistor arrays RN1 ... RN11 allow the inputs to be configured according to individual requirements.

The number of inputs should be limited in the configuration of the board so that there are no open inputs.
The inputs can be wired with the resistor arrays RN3,4 as required to Gnd or +15V. They will thereby always be in a defined state, even when open. As standard, RN3,4 is wired to Gnd.

Customized modifications are available as needed.