2 Channel Serial Input/Output

INFO-SIO

S-I/O Gateway Communication
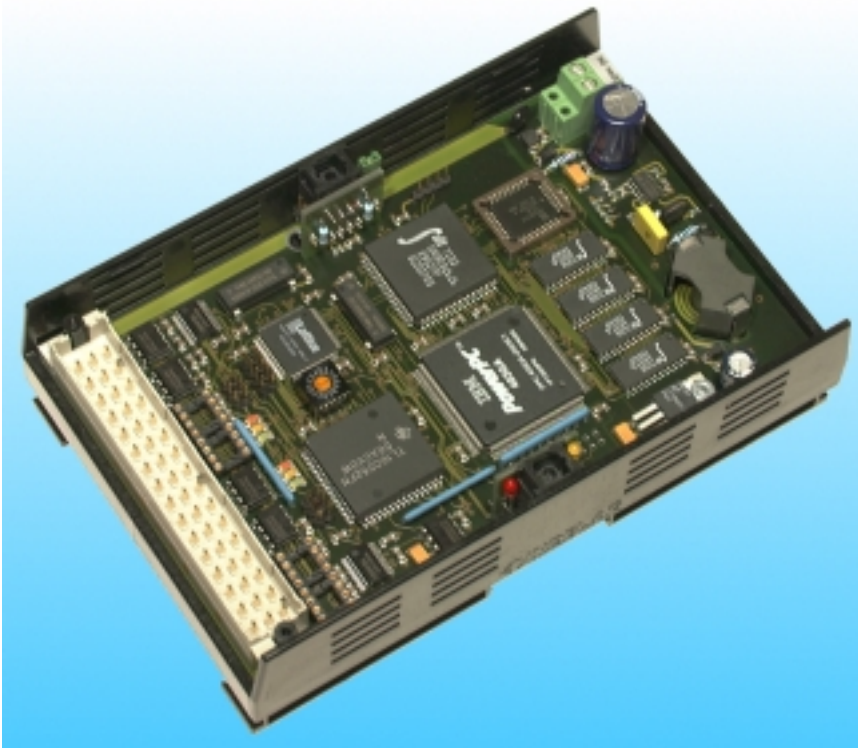
Technical Data

2 S-I/O interfaces
- RS232
- RS422/RS485
- Current Loop (20mA)

Baud rate
- Up to 115.2 KBaud freely selectable

32-Bit RISC processor
- PowerPC 604GA-25
- 25 MHz clock rate
- 2-channel-UART 16552

Memory
- 128kByte 32-bit Cache-RAM
- 128kByte Flash-EPROM
- 4kByte Dualport RAM to the INFO-Link

Protocols
- Software tool for implementing customized communication protocols
- Siemens 3964R protocol for PLC links
- Printer activation (without protocol)

The INFO-SIO board provides the INFO-Link with a decentralized, powerful communications interface.

The serial interface allows connection of printers, operator panels and other third-party devices. Data exchanges with a PLC or other intelligent system components can also be performed by the SIO. The board has its own processor system, relieving the Master of consuming communication activities.

With the aid of a software tool, you can implement your own user-specific protocols with little effort.

The SIO can also be used as a debug interface.

Order No.   INFO-SIO   96220

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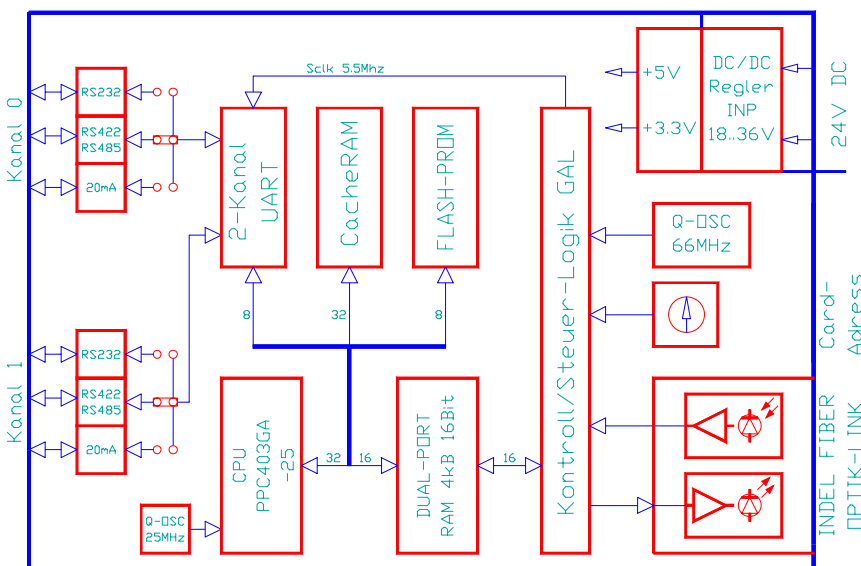
Mode of Operation

The INFO-SIO board has two independent serial interfaces, which can be configured with a jumper as required to RS232, RS422 or 20mA (Current Loop).

The standard firmware supports any number of INFO-SIO boards. In case of intensive data traffic, the meaningful limit is at 4 INFO-SIO boards or 8 channels.

The channels are addressed via the device number 0 ... n. The transmission format is specified in the common INDEL form. An exception is the baud rate, which can be selected as required up to 115.2 kBaud, thereby allowing also devices with exotic baud rates to be addressed.

The PowerPC Master transfers (transmits, receives) the SIO data blocks with a maximum size of 512Byte. These are buffered in the cache of the SIO. Per channel, 2kByte input and 2kByte output buffer are available. The field bus master has nothing to do with the actual data transmission. The INFO-SIO board with the 32-bit RISC processor PowerPC(PPC403GA-25) performs all the communication activities. It manages the input and output buffers so that communication can take place at a rate of up to 115.2 KBaud simultaneously and without loss on both channels.

Customized communication protocols

Customized communication protocols are implemented with a software tool provided by INDEL AG.
This allows third-party devices or other networks to be easily and quickly coupled to the INFO-Link.
The board is provided with a 128kByte (32Bit) Flash-EPROM, allowing a firmware update via the INFO-Link whenever the need arises.

Connector Allocations

		d		b		z
Channel 0	2		Shield	O	TXD	I	RXD
	4		Shield	O	RTS	I	CTS
	6	O	V +	O	DTR	I	DSR
	8	O	V -	I	DCD	I	RING
	10		Shield	I	SINP -	I	SINP +
	12		Shield	O	SOUT -	O	SOUT +
	14		Shield	I	INP -	I	INP +
	16		Shield	I	OUT -	O	OUT +
Channel 1	18		Shield	O	TXD	I	RXD
	20		Shield	O	RTS	I	CTS
	22	O	V +	O	DTR	I	DSR
	24	O	V -	I	DCD	I	RING
	26		Shield	I	SINP -	I	SINP +
	28		Shield	O	SOUT -	O	SOUT +
	30		Shield	I	INP -	I	INP +
	32		Shield	I	OUT -	O	OUT +

Connector 1
vertical
DIN 41612, Type F-48
2.8mm pins

Connector 2
PCB terminal
Phönix

1	0V	I
2	24V	I

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Assembly
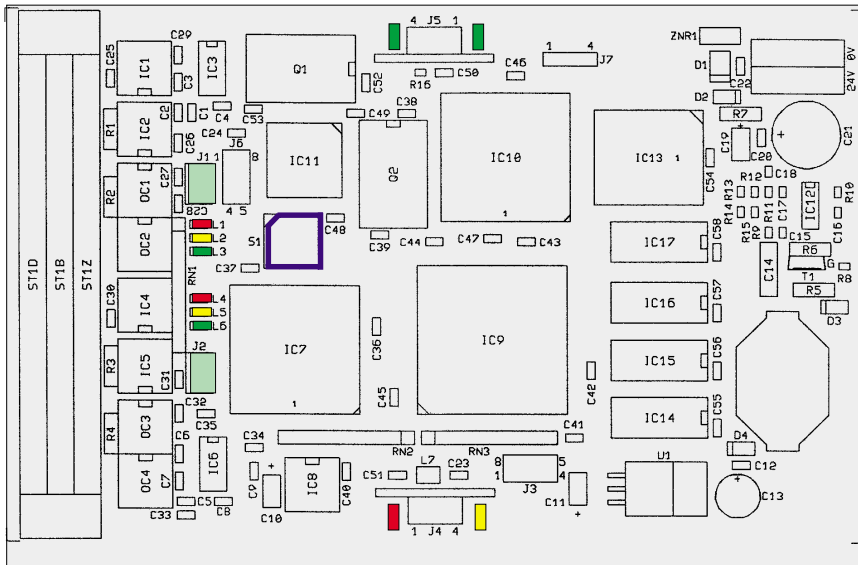
Addressing (blue)

S1 (X0) Communication channel

0	0
…	
3	3

LED

Per channel, 3 LEDs are included, which signalize the following functions:

L1:	red	=	Channel active
L2:	yellow	=	Receive data
L3:	green	=	Transmit data

LEDs on receiver module

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

Interface type (light green)

The interface type is set with the aid of jumpers. The jumper fields are designated J1, J2 (see assembly diagram).

J1, J2

	RS422/RS485
	20mA
	RS232

Transmit power jumpers (green)

The jumpers influence the illlumination 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

Specifications

Power supply

+18 ... 36V, 250mA max.

Climatic conditions

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

32-Bit RISC processor

- PowerPC 403GA-33
- 25MHz clock rate

Memory

- 128kByte 32-Bit Cache-RAM, 15ns
- 128kByte Flash-EPROM
- 4kByte Dualport RAM
  to the INFO-Link

S-I/O interfaces

- 2 independent interfaces
- 2-channel UART 16C552
- 2kByte FIFO buffer storage
- RS232, RS422/RS485, 20mA
- Transmission max. 115.2 kBaud

RS232

- Baud rate max. 115.2 kBaud
- RTS, CTS, DSR, DTR, DCD
- XON/XOFF operation
- Line length max. 3m

20mA Current Loop

- Baud ate max. 20 kBaud
- Line length max. 400m

RS422 / RS485

- Baud rate max. 115,2 kBaud
- Line length max. 1200m

Special items

- Serial debug interface

Mounting

- Connector DIN 41612, Type F-48
- 35mm DIN bar mounting
- Dimensions:
  165 x 105 x 45 mm (LxWxH)

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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

It is essential to operate the RS232 interfaces with shielded cables. The shield must be connected inside the connector at both ends to the metallic connector housing. (Do not ground through the shield pin!)

The Current-Loop and the RS422 interface can be operated with twisted pair lines. For short distances, an unshielded cable will suffice.

For connections of the RS422 across long distances (> 100m), it is of advantage to use a shielded twisted pair line.

Power supply V+, V-

This power supply (± 15V) serves for setting the unused control lines for a minimum connection (software handshake).

The power supply must only be wired to the connector 1 of the SIO.
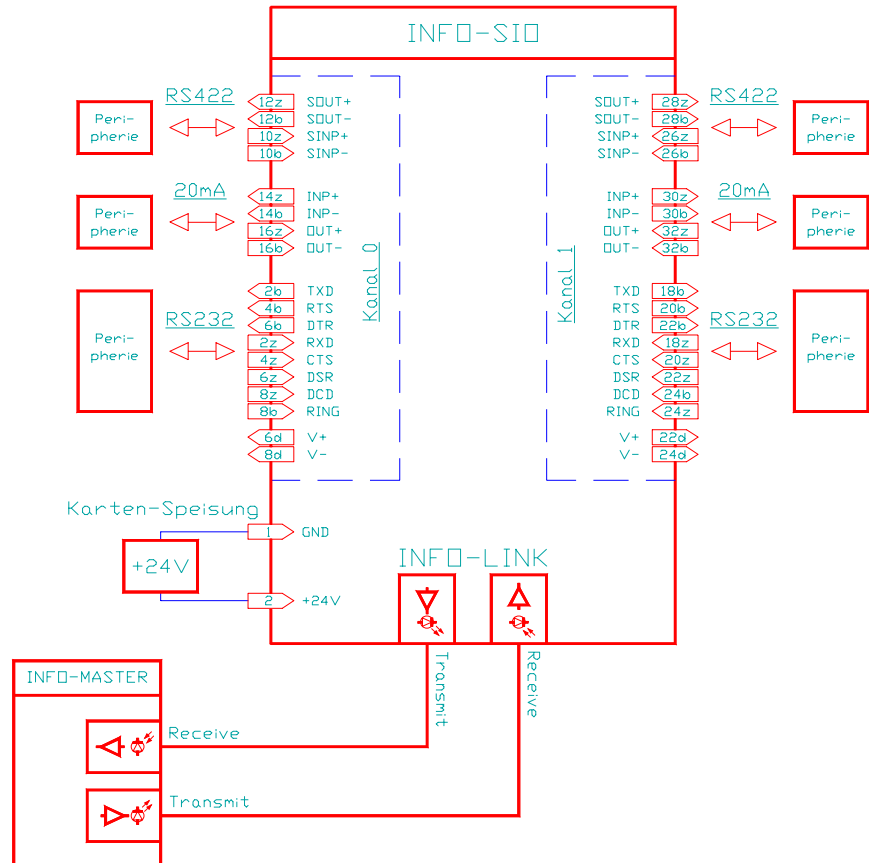
Grounding

The INFO-SIO 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
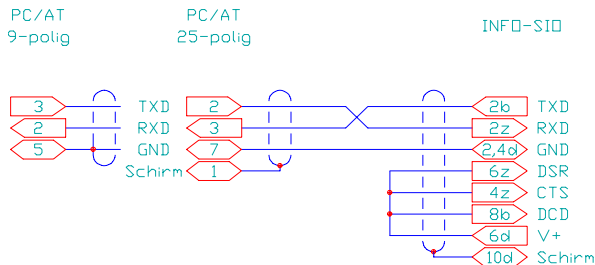

Caution: Laptop users

Observe the following sequence when connecting a laptop computer to the SIO:

1. Isolate power supply from laptop so that it is only supplied with power from the accumulator.
2. Connect the SIO and laptop with the appropriate serial cable.
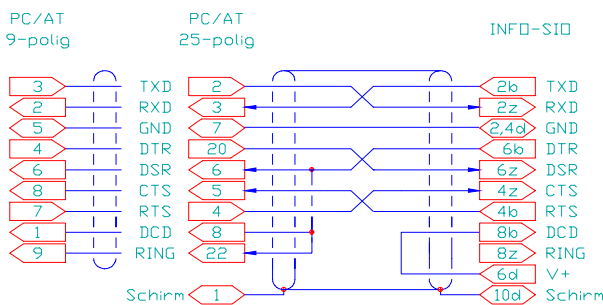3. Reconnect the power supply.

Reason: As a result of the electrical isolation of the transformer, the laptop power supply is raised to a potential of 110V (providing the laptop is supplied from the 230V power supply). Because no assurance can be given with conventional SUB-D connectors that the shield will contact before the signal lines, there is danger of potential equalization taking place via the signal ground line. This would destroy the associated SIO channel.
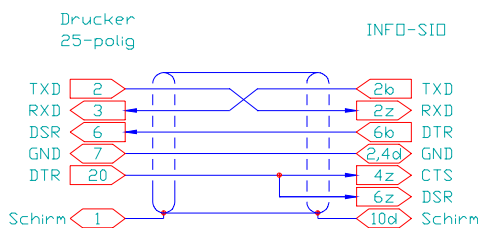
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Interfaces

Minimum connection

Maximum connection

Printer connection

Pin description

TxD	Transmitted Data	DTR	Data Terminal Ready
RxD	Received Data	DSR	Data Set Ready
RTS	Request to Send	DCD	Data Carrier Detect (CD)
CTS	Clear to Send	RI	Ring Indicator

Description

RS232 interface

In practice, handling of the RS232 interface often causes some difficulties as a result of the various possibilities of data transmission and the allocations of the cable connections, which are not always so easy. In order to ensure proper and reliable operation between the INFO-SIO and the connected peripherals, wiring recommendations are given opposite. The sketched cable connections correspond to the connector allocations of channel 0 of the INFO-SIO board. The connector allocations of the peripheral devices (modem, printer, etc.) are standardized.

Minimum

This connection (PC - INFO-SIO) is mainly applied for debugging, data transmission and operating data collection. It is often also called the minimum connection with software handshake.

Maximum

This connection type must be supported by the PC software. This variant uses two handshake line pairs:
Data Terminal Ready → Data Set Ready and Request to Send → Clear to Send. Other handshakes are possible. All inputs and outputs (data, control, message lines) are used (full handshake).

Printers

Standard printer cables for serial interface, 25-pin.
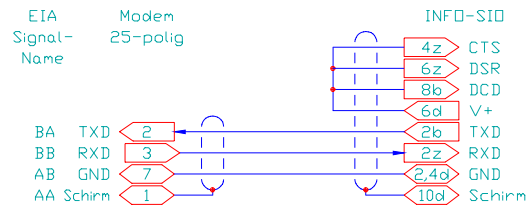The DSR input serves for paper end detection.

Description

Interfaces

Modem minimum

The simplest method of data transmission is INFO-SIO modem. This connection does not require any control/message lines.
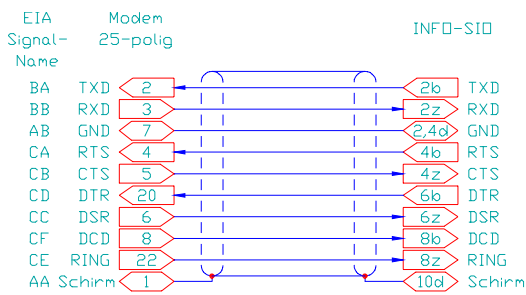
Modem minimum

Modem maximum

But if a connection with all data, control and message lines (full handshake) is required, this connection cable must be used.

Modem maximum

Jumper resistor allocation

In order to adjust the Current-Loop and the RS422 interfaces to the existing conditions, the series resistor and the termination resistor can be applied on a user-specific basis.

R1 and R3 are the termination resistors of the channels 0 and 1 of the RS422 interface. Typical: $R1,3 = 120\Omega$.

R2 and R4 are the series resistors of the channels 0 and 1 of the Current-Loop interface. Typical: $R2,3 = 1k\Omega$, at 24V.

For operation of the 20mA inteface, optocouplers OC1 ... 4 are in addition necessary.
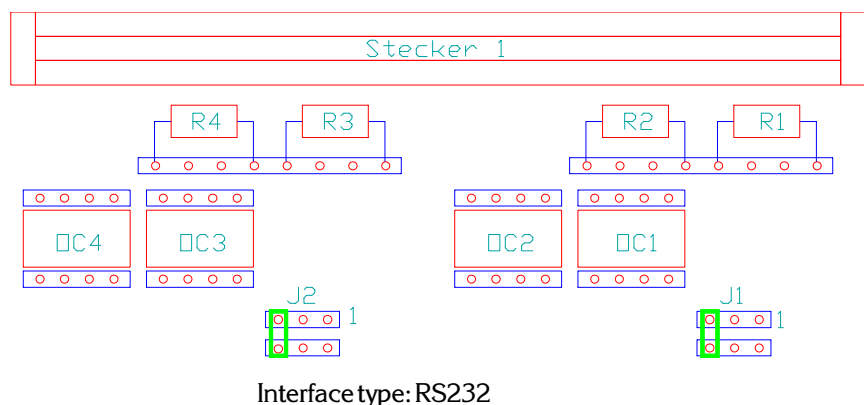
OC1,3 HCPL-4200 from HP
OC2,4 HCPL-4100 from HP

The jumpers 1,2 determine the interface type:

Pin 1, 6:   RS422
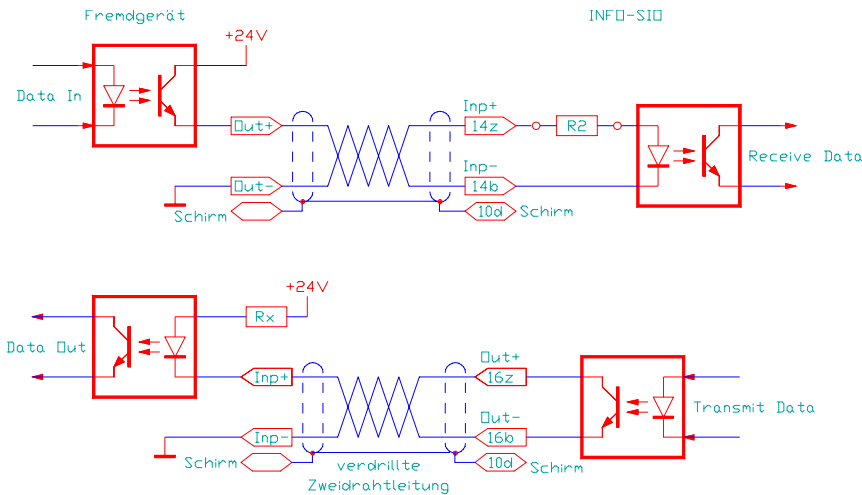Pin 2, 5:   20mA
Pin 3, 4:   RS232

Jumper resistor allocation

Interface type: RS232

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Interfaces

Description

20mA Current Loop

RS422 interface

20mA Current Loop

The 20mA or Current Loop interface transmits the data by the activation and deactivation of a 20mA current in a conductor loop at the rate of the data bits. In the resting state, i.e. during transmission of "1" bits, a constant current of 20mA will flow. "0" bits are characterized by an interrupted flow of current. Within each current loop, only one connected device is allowed to supply the required loop current of 20mA. This device is designated as being active, the others as passive. The 20mA interface of the INFO-SIO board is designed as passive.
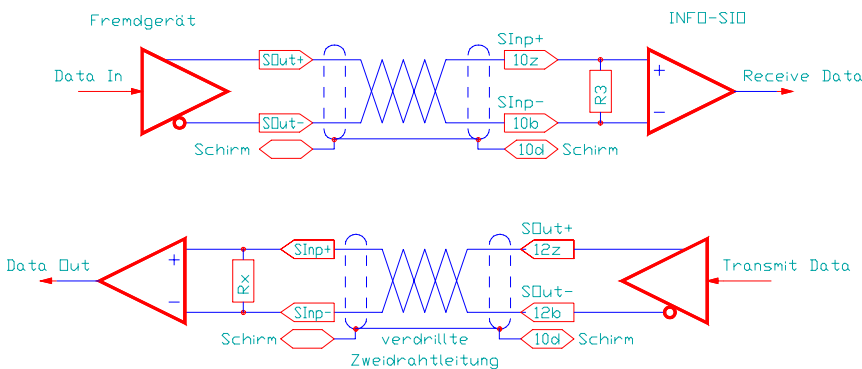
RS422 interface

RS422 and RS485 interfaces have been developed for serial data transmission across large distances and are increasingly being used in the field of industry. The serial data are transmitted as a voltage difference between two corresponding lines. The receiver only evaluates the difference between the two lines. Data transmission systems across distances of up to 1200m can be implemented.

Note

The control lines CTS, DSR, DCD are also processed in 20mA, RS422 and XON/XOFF operation.

The ring indicator (8z, RING) is not required for establishing the connection; it can be used as a status input.

Important

The DCD input serves in modem operation as Data Carrier Detect. When the DCD is inactive, the input channel is switched off and no incorrect or non-defined characters can be received. For RS232 operation, the DCD input must be switched to V+.