INFO-RISC-Master for PC/AT

INFO-PPC

PC/AT
INFO-Link
Field Bus Ma-
ster

Technical Data

Operating system
- Multitasking operating system
- Real-time-enabled

32-Bit RISC processor
- PowerPC 603E
- 200 MHz clock rate
- 20 x more powerful than the INFO-PC master

Local bus
- 33 MHz 32-bit bus
- Highspeed burst mode
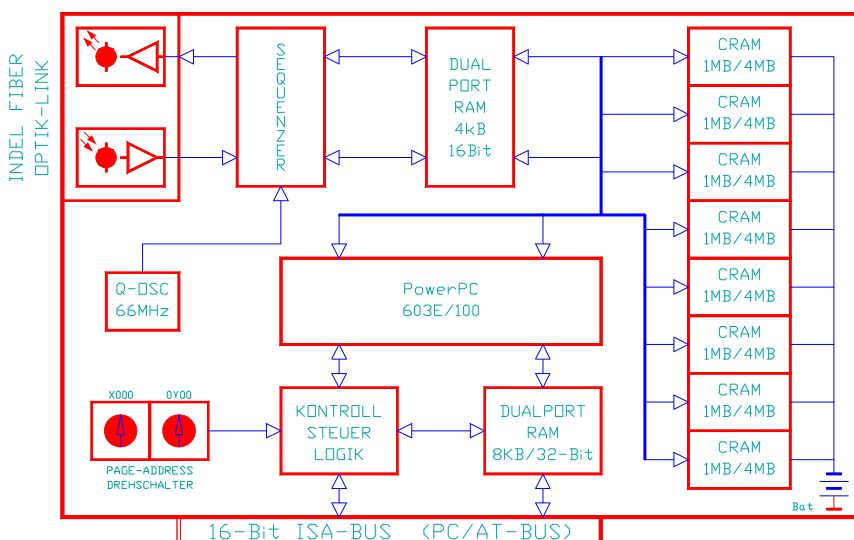
Memory / interfaces
- 1 MByte CRAM battery buffered
- expandable to 4 MByte
- 8 kByte 32-bit dual port RAM as interface with PC/AT
- 4 kByte 16-bit dual port RAM as interface with INFO-Link

INFO-Link
- Fiber-optic medium
- Ring topology with deterministic access time
- 11 MBit/s transmission rate
- up to 250 field bus nodes
- Link cycle time: 1 ms (250 users)

PC interface
- 32-bit PCI- bus
- 16-bit ISA-bus

The INFO-PowerPC board is the field bus master via an INFO-Link. It is available as an PCI-bus or ISA-bus plug-in board and can be operated in any PC or industrial PC (IPC) with the INCO server. The heart of the master is the powerful RISC-CPU: PowerPC 603E, with 200 MHz clock rate. The real-time multitasking operating system of the master performs the entire control of the machine or plant. In other words, the master operates fully autonomously, the processor power of the PC/IPC is not involved. Thanks to this decoupling, the PC can be used for higher-ranking functions such as visualization and operating data collection. Programming of the master is done in C++ and/or the PLC-like ISM language, which is also real-time-enabled and multitasking-enabled.

The INFO master boards allow up to 250 INFO modules to be connected via fiber-optic lines to any PC/AT.

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Function

Structure of the master

The field bus master has two interfaces in the form of dual port RAMs to communicate with the PC and the field bus.

In the INFO DP-RAM between the field bus and the master are the incoming and outgoing address and data words of the individual field bus nodes and a job table. Each field bus user occupies one or more addresses and one or more jobs. An INFO-4kp board, for example, occupies one address and one job per channel. The hardware-implemented sequential logic processes the maximum 250 jobs and transmits addressed telegrams to the existing bus users. This process is executed independently of the processor and does not require any CPU power. The sequencer requires only 4µs for addressing a 16-bit user, and 6ms for a 32-bit user. During the bus cycle time of 1 millisecond, all max. 250 users are addressed once!

Data processing

The process data obtained such as temperatures, resolver values, analog measurement values, etc. are processed directly by the operating system of the master. The master makes the automatic offset and full scale correction for all analog values and converts them to the relevant unit. Temperature measurement values are linearized sensor-specifically and converted to degrees Celsius. In addition, increments of position boards are converted to degrees, meters or mm. The entire process map including the configuration parameters is provided in the 8kByte large PC dual port RAM, which forms the interface with the PC. The configuration data is available throughout the system via names. A store area of 4kByte of the DP-RAM is reserved for data transfers to the visualization system. The PC has permanent access to the current process map. The master can be addressed from any higher programming language via DLL.

Block Circuit Diagram
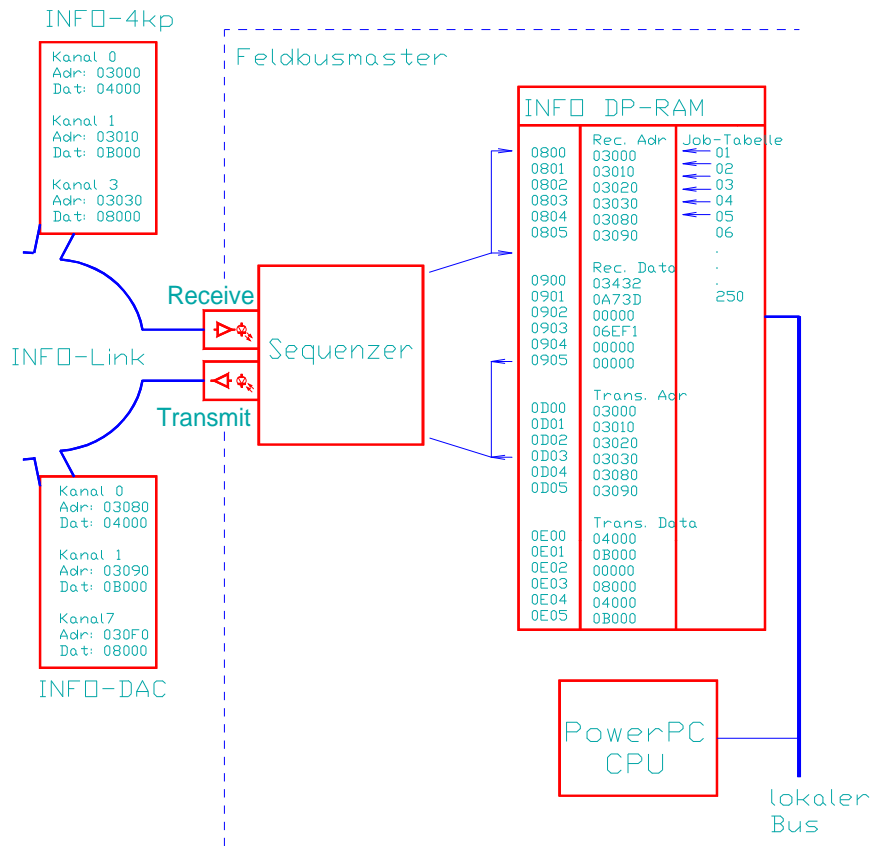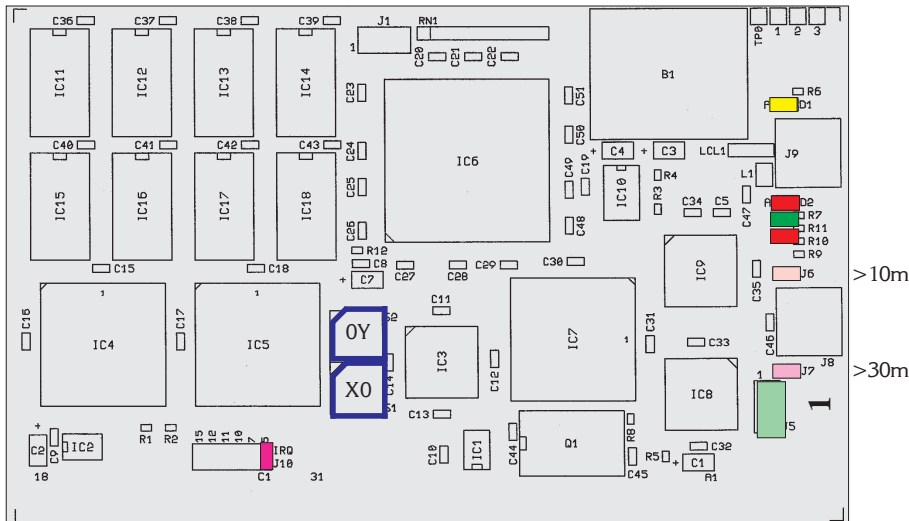

Functioning principle of the sequencer

Control tasks

The PowerPC master is in a position to perform high-precision and very fast control tasks: The firmware independently controls up to 64 axes by S-profile as standard. The standard sampling rate is 0.5, 1, 2, 4ms, as required. Almost any user-specific ramp forms are possible, e.g. sine ramps.

Also special functions such as temperature control can be added.

Operating system

The multitasking operating system can process any number of different tasks concurrently and in real time.

In time-critical complex plants, the master will ideally control the entire machine sequences, whereas the PC/IPC, for example under WINDOWS95/NT, performs the visualization and operating data collection tasks. Programming of the master is done in C++ and/or the proven INDEL Multitask System ISM 6.0.

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ASSEMBLY

>10m

>30m

Jumpers (green)

The two transmitter jumpers influence the light intensity of the emitting LED and thereby the length of the light path to the next board.

For the correct matching of the emitting light intensity to the cable attenuation, plug the jumpers as follows:

Segment length	Jumper position
0 ... 10m	no jumper
8 ... 30m	>10 (pink)
20 ... 50m	>30 (magenta)

The question as to when exactly replugging is necessary depends, among other factors, also on the number and tightness of the bending radii during cable installation.

To determine whether the light intensity has sufficient reserves, you may use a device for measuring the available light power.

For a fast diagnosis, bend each partial section the fiber-optic line 180 degrees around a finger (diameter 15 ... 20mm). This will cause an additional attenutation with which the Link must continue to run without the error counter counting (see software operating instructions).

A device for measuring the amount of light is planned for the INFO-Link and will help verify the individual line sections, mainly when the fiber-optic lines are installed in inaccessible ducts.

LEDs on the receiver module:

LED-yellow	=	INFO-Link receiver signal OK;
		lights up at each telegram destined for this module
LED-red	=	+5V power supply
LED-green	=	Ok
LED-red	=	Error

GAL-Update (light-green)

Will be needet to update the GAL-Software

Specifications

Power supply
+5V, 2A max.

Cooling
- The board generates approx. 6W dissipation. This must be removed directly at the board, e.g. by means of a fan. In industrial PCs, such fans are usually provided.

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

Standard version
- PowerPC 603E, 200MHz
- 1MByte CRAM with battery

Options
- 4MByte CRAM

Interrupt (violet)
The INFO-PowerPC master can trigger an interrupt in the PC for special functions via the dual port RAM. It can be switched by means of a jumper (light green) to IRQ 5, 7, 10, 11, 12 or 15.

Addressing
The address XY00 (blue) is set by means of the rotary switches X and Y, e.g. CE00. The board occupies 8kByte address space. If virtual memory managers are applied (e.g. QEMM, 386MAX or WINDOWS), this area must be excluded.

Mounting
- 16-bit ISA bus slot PC/AT
- short PC/AT plug-in board
- 100 x 160mm

Battery
- Life span over 5 years

INFO-Link

INFO-Link

The INFO-Link connection is identical on all INFO boards. The TOS-Link module with the two jumpers is always the transmitter, the module with the two LEDs is the receiver.
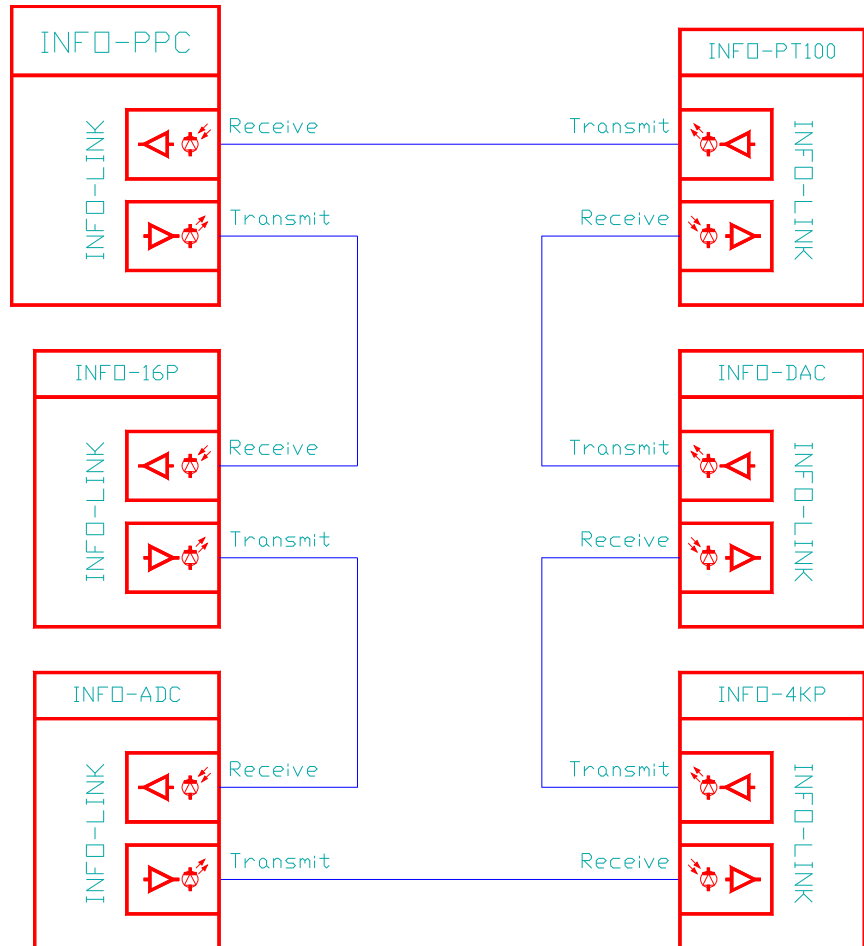
Arrangement

The PowerPC master and the existing INFO boards (slaves) must be connected in series according to the connection example. The sequence of the slave number on the INFO-Link is freely selectable.

Fiber-optic line

As a field bus cable, it is possible to apply the APF fiber (all plastic fiber) up to a max. line length of 30 ... 50m in the standard version. When the special PCF fiber (plastic cladding silica fiber) is used, the transmission distance may be as long as 1000m. From 100m, however, the INFO modules must be equipped with special TOS-Link transmitter modules, which operate in the non-visible infrared region.

When opening and closing the cable ducts, take care to ensure that the bending radii of the installed fiber-optic lines are not made any tighter. Normal pneumatic hoses slipped over the fiber-optic line have proved to provide the best protection.

Connection Example

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Troubleshooting

Faults

Since all INFO modules are connected in series, the link will be interrupted as soon as a module is without power. Therefore, make sure that all boards are supplied with power (the red LED at the receiver module must be lit).
Some INFO modules from older series (e.g. INFO-16P, INFO-4KP) have built-in fuzes. When these have blown, an LED will light up under the defective fuze. Therefore, if necessary remove the cover to determine whether a fuze may have blown.

Red LED not lit

When the master is active (TRANS successfully done), it will continuously transmit data via the INFO-Link. To determine whether the master is active and performing properly, establish a direct connection by means of a fiber-optic line between the master transmitter and the master receiver. (Remove the transmitting power jumper if the fiber-optic line is shorter than 10m.) Now, the yellow LED on the master must be lit.

Now include the first INFO board in the fiber-optic loop and set the transmitting power jumper according to the fiber-optic line length. If this module is correctly addressed by the master, the yellow LED must now also light up here.

Include all the other INFO modules accordingly in the fiber-optic line until all modules are functioning and also the last yellow LED in the circuit and on the master is lit. Now, the link is OK throughout.

Yellow LEDs not lit

The link is obviously closed and OK. Either your module is not included in this circuit, or it is not addressed by the master. Check whether the board type and the address switch are according to your configuration in the Config file. In the case of customized boards, also the associated software must be loaded in the master.

Yellow LED on master is lit, but not on external module

Your link obviously incorporates a section that may be subject to interference. The cause is normally an insufficient amount of incoming light at the receiver, in rare cases also too much light. In any event, check first whether the transmitting power jumpers are correctly set on all Info modules and the master, and whether there are sufficient light reserves (see page 3).

From an electrical point of view, the receiver is the most sensitive component on any INFO module, since the light pulses are converted here into currents of only a few pA. Although the casing of the INFO modules is made of iron-containing plastic with special screening characteristics, inadequately arranged relays or contactors may easily interfere with the receiver as a result of unquenched contacts. An adequate distance and grounded screening plates usually help most in this case. (See also INDEL wiring guidelines, design guidelines.)

Error or LinkDown counter is counting

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