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IPC/SIC4-1AE, -1BE
IPC/SIC4T-1AE, -1BE

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1.0	03.10.2006	U. Müller	first release
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1.2	24.09.2010	U. Müller	Adress config tables 11 and 12 corrected

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1 Introduction

1.1. General Remarks

The content and presentation of this document has been carefully checked. No responsibility is accepted for any errors or omissions in the documentation.

Note that the documentation for the products is constantly revised and improved. The right to change this documentation at any time without notice is therefore reserved.

Syslogic is grateful for any help referring to errors or for suggestions for improvements.

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1.2. Contents of this Documentation

This document addresses to system integrators, programmers and instructed installation and maintenance personal working with the IPC system. It provides all information needed to configure, setup and program the serial interface board IPC/SIC4-1AE and IPC/SIC4-1BE. The boards IPC/SIC4-1AE and IPC/SIC4-1BE are functionally very similar. The IPC/SIC4-1BE offers galvanic isolation on all interfaces. For complete information also the documentation of the mounted CPU board and communications and I/O boards must be consulted. As the IPC/SIC4 board may be delivered in various versions with optional hardware blocks the fully equipped version is described here, which includes all hardware function blocks.

1.3. Additional Products and Documents

1.3.1. Hardware Products

The following hardware products are useful together with the IPC/SIC4 board:

– IPC startup guide and tools
– IPC/NETIPC CPU boards
– IPC communication boards
– IPC I/O boards

(see product catalog for details)

1.3.2. Software Products

The following software products are useful together with the IPC/SIC4 board:

– Firmware for IPC CPU boards: e.g. IPC/NETIPCFW-1A
– Sample program code and utilities for x86 based FBCube systems:
IPC/IOCOMSW-1A

1.3.3. Documents

The following documents are *required* for correct installation and operation of the IPC/SIC4 board:

– DOC/CUBINST: User Documentation for FBCube Installation
Note : also contains the necessary information related to the "ce"-certification of the products
– User Documentation for Basic Firmware (dependent on CPU board)
– DOC/IPC_IOCOMSW: User Documentation for Programming Examples and Utilities

1.4. Items delivered

The IPC/SIC4 module is delivered without any mechanical mounting material. The user should order the required mechanical mounting material according to his needs (open frame mounting, 19"-rack mounting, DIN-rail mounting etc.). Note that the technical documentation is not part of the delivery and must be ordered separately or downloaded from the Internet.

A CPU board, power supply board and enclosure are necessary to build a complete system. All items must be ordered separately and installed according to the respective user documentations. A standard base configuration could be as follows:

– IPC system with NETIPC-2A CPU board and free slot for I/O board:
IPC/COMPACT2-2E
– external power adapter
– CompactFlash
Note : Mounting procedure is described in DOC/COMPACT2-2E

1.5. Installation

The installation of the IPC system is described in the documentation DOC/CUBINST.

The firmware configuration and download is described in the appropriate firmware documentation.

Important Note

Before applying power to the IPC system the all boards must be correctly configured and mounted (please consult User Documentation of the selected boards).

1.6. Safety Recommendations and Warnings

The products are intended for measurement, control and communications applications in industrial environments. The products must be assembled and installed by specially trained people. The strict observation of the assembly and installation guidelines is mandatory.

The use of the products in systems in which the life or health of persons is directly dependent (e.g. life support systems, patient monitoring systems, etc.) is not allowed.

The use of the products in potentially explosive atmospheres requires additional external protection circuitry which is not provided with the products.

In case of uncertainty or of believed errors in the documentation please immediately contact the manufacturer (address see chapter 8). Do not use or install the products if you are in doubt.

In any case of misuse of the products, the user is solely liable for the consequences.

1.7. Life Cycle Information

1.7.1. Transportation and Storage

During transportation and storage the products must be in their original packing. The original packing contains an antistatic bag and shock-absorbing material. It is recommended, to keep the original packing in case of return of the product to the factory for repair. Note that the packing is recyclable.

1.7.2. Assembly and Installation

Observe the EMI-precautions against static discharge. Carefully read the assembly and installation documentation (Document DOC/CUBINST) before unpacking the products. Make sure that you have all the necessary items ready (including all the small parts). Follow the assembly guidelines in DOC/CUBINST strictly.

The installation procedures (contained in document DOC/CUBINST) must be strictly observed. Note that deviations from the installation guidelines may result in degraded operational reliability or in unfavourable EM-radiation or EM-susceptibility.

1.7.3. Operation

The operating environment must guarantee the environmental parameters (temperature, power supply, etc.) specified in the technical specification section of the product manuals.

The main functionality of the system is defined by the application programs running on the system. The application programs are not part of the delivery by Syslogic but are defined, developped and tested by the customer or a system-integrator for each specific application. Refer to the respective documentation for more information.

1.7.4. Maintenance and Repair

The product features error- and malfunction-detection circuitry. Diagnostic information gathered is transferred to the applications software where it can be used. In the rare case of a module hardware-failure or malfunction, the complete module should be exchanged. The faulty module must be returned to the factory for repair. Please use whenever possible the original packing for return of the product (EMI and mechanical protection).

1.7.5. Disposal

At the end of the lifespan the product must be properly disposed. IPC products contain a multitude of elements and must be disposed like computer parts. Some of the IPC products contain batteries which should be properly disposed.

2 Product Description

2.1. Features

The 4 channel serial interface board IPC/SIC4(T)-1AE, -1BE is used for communication over standard RS232, RS422 or RS485 interface. The boards IPC/SIC4(T)-1AE and IPC/SIC4(T)-1BE are functionally identical, they only differ in the galvanic isolation of the serial interfaces (see technical data section).

The block diagram of the board is shown in Fig. 1.
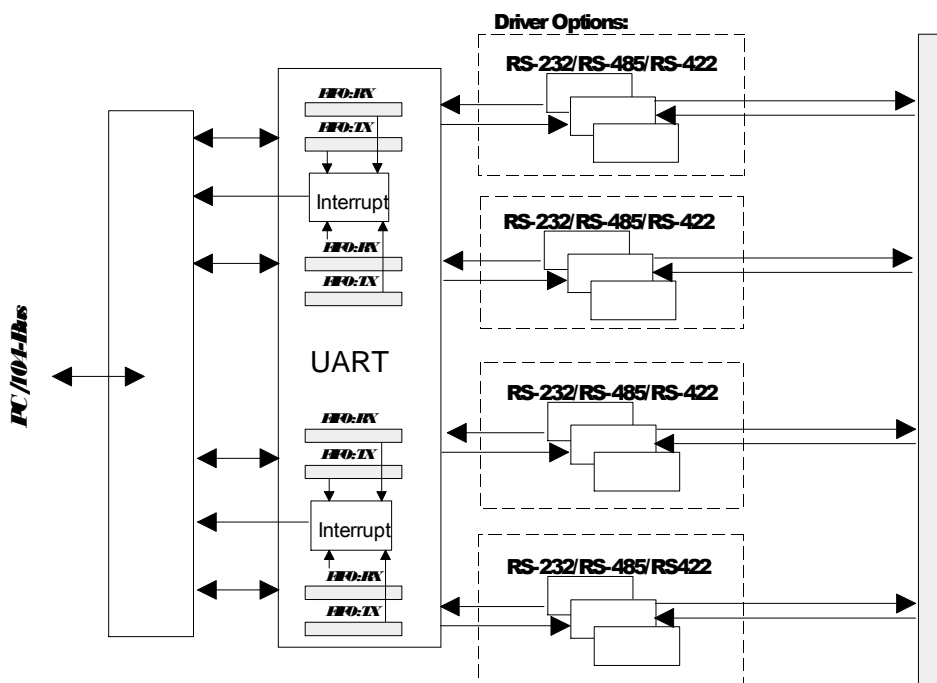
Fig. 1   Block Diagram

The main functional elements are:

- – PC/104 local bus interface
- – board base address selection switch
- – interrupt selection switches
- – interface configuration switches
- – 4 standard UARTs (16C550 compatible but with 64 bytes FIFOs)
- – standard RS232/422/485 drivers

2.2. Functional Differences

The SIC4 board may be ordered in different variations. Main differences are galvanic isolation, connector type and configurability. Other variations are available on request.

2.2.1. IPC/SIC4-1AE, -1ASE

RS232 only.

No galvanic isolation.

Supported signals: RX/TX/RTS/CTS/DTR/DSR/DCD/RI.

Four separate 2x5 pin headers for direct flat cable DSUB connection.

2.2.2. IPC/SIC4T-1AE, -1ASE

RS232 only.

No galvanic isolation.

Supported signals: RX/TX/RTS/CTS/DTR/DSR/DCD/RI.

36 pin terminal block connector and four separate 2x5 pin headers for direct flat cable DSUB connection (RI signal not available on terminal block).

2.2.3. IPC/SIC4-1BE, -1BSE

RS232/RS422/RS485 configurable (full/half duplex, echo cancellation).

Galvanic isolation.

Supported RS232 signals in isolation mode: RX/TX/RTS/CTS only.

Supported RS232 signals in non-isolation mode: RX/TX/RTS/CTS/DTR/DSR/DCD/RI.

Four separate 2x5 pin headers for direct flat cable DSUB connection.

2.2.4. IPC/SIC4T-1BE, -1BSE

RS232/RS422/RS485 configurable (full/half duplex, echo cancellation).

Galvanic isolation.

Supported RS232 signals in isolation mode: RX/TX/RTS/CTS only.

Supported RS232 signals in non-isolation mode: RX/TX/RTS/CTS/DTR/DSR/DCD/RI.

36 pin terminal block connector and four separate 2x5 pin headers for direct flat cable DSUB connection (RI signal not available on terminal block).

2.3. Connector Assignments

The input-/output connector/pin assignment for the board is shown in Tab. 1.

Mating plug type: Weidmüller B2L 3.5/36F SN SW (Weidmüller ordering code 1748320000)

Field wiring: AWG18...28 / 0.5-1.0 mm^2
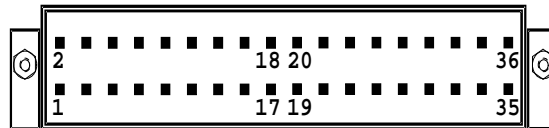
Fig. 2   Process Interface Connector P1

I/O Connector Pin	Process Interface Signal	I/O Connector Pin	
1	A DCD* Data Carrier Detect	2	A DSR* Data Set Ready
3	A RXD Receive Data	4	A RTS* Request to Send
5	A TXD Transmit Data	6	A CTS* Clear to Send
7	A DTR* Data Terminal Ready	8	A GND Signal Ground
9	B DCD* Data Carrier Detect	10	B DSR* Data Set Ready
11	B RXD Receive Data	12	B RTS* Request to Send
13	B TXD Transmit Data	14	B CTS* Clear to Send
15	B DTR* Data Terminal Ready	16	B GND Signal Ground
17	Shield	18	Shield
19	Shield	20	Shield
21	C DCD* Data Carrier Detect	22	C DSR* Data Set Ready
23	C RXD Receive Data	24	C RTS* Request to Send
25	C TXD Transmit Data	26	C CTS* Clear to Send
27	C DTR* Data Terminal Ready	28	C GND Signal Ground
29	D DCD* Data Carrier Detect	30	D DSR* Data Set Ready
31	D RXD Receive Data	32	D RTS* Request to Send
33	D TXD Transmit Data	34	D CTS* Clear to Send
35	D DTR* Data Terminal Ready	36	D GND Signal Ground

Tab. 1   Process Interface Connector P1 (all channels RS232)

I/O Connector Pin	Process Interface Signal	I/O Connector Pin	
1	no connection	2	no connection
3	A RX- Receive Data minus	4	A RX+ Receive Data Plus
5	A TX- Transmit Data minus	6	A TX+ Transmit Data Plus
7	no connection	8	RGND Signal Ground
9	no connection	10	no connection
11	B RX- Receive Data minus	12	B RX+ Receive Data Plus
13	B TX- Transmit Data minus	14	B TX+ Transmit Data Plus
15	no connection	16	RGND Signal Ground
17	Shield	18	Shield
19	Shield	20	Shield
21	no connection	22	no connection
23	no connection	24	no connection
25	C DATA- Data minus	26	C DATA+ Data Plus
27	no connection	28	C RGND Signal Ground
29	no connection	30	no connection
31	no connection	32	no connection
33	D DATA- Data minus	34	D DATA+ Data Plus
35	no connection	36	D RGND Signal Ground

Tab. 2   Process Interface Connector P1 (channels A/B RS422, C/D RS485)

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Pin Number	Signal	Pin Number	Signal
1	DCD*	2	DSR*
3	RXD	4	RTS*
5	TXD	6	CTS*
7	DTR*	8	RI*
9	GND	10	no connection

Tab. 3   Serial Port Channel A, B, C and D internal Headers P10, P20, P30, P40 (2x5 pin, RS232)

Pin Number	Signal	Pin Number	Signal
1	no connection	2	no connection
3	RX-	4	RX+
5	TX-	6	TX+
7	no connection	8	no connection
9	RGND	10	no connection

Tab. 4   Serial Port Channel A, B, C and D internal Headers P10, P20, P30, P40 (2x5 pin, RS422)

Pin Number	Signal	Pin Number	Signal
1	no connection	2	no connection
3	no connection	4	no connection
5	DATA-	6	DATA+
7	no connection	8	no connection
9	RGND	10	no connection

Tab. 5   Serial Port Channel A, B, C and D internal Headers P10, P20, P30, P40 (2x5 pin, RS485)

Pin Number	Signal	Pin Number	Signal
1	no connection	2	no connection
3	no connection	4	no connection
5	no connection	6	TLS- (A)
7	no connection	8	TLS+ (B)
9	RGND	10	no connection

Tab. 6   Serial Port Channel A, B, C and D internal Headers P10, P20, P30, P40 (2x5 pin, TLS-RS485)

2.3.1. Factory Connectors

Pin Number	Signal	Remarks
1	TCK	do not use
2	TDO	do not use
3	TMS	do not use
4	TDI	do not use

Tab. 7   Factory Programming Header J2 (1x4 pin)

2.4. Bus Interface (PC/104)

The PC/104 bus interface of the IPC/SIC4 allows connection to a wide range of processor boards. The bus interface is described in the IEEE 996 and 996.1 standards documentation. The bus connector pinout is shown in Tab. 7. Depending on the board version the bus connector may have a different form factor but the position of the PC/104 signals stay the same. This enables to support additional bus signals (Vbatt, Power, etc) on one single connector block.

Pin		Signal Name	Pin		Signal Name	Pin		Signal Name	Pin		Signal Name
						A1	⊗	IOCHCK#	B1	⊗	GND
P11			P12			A2	⊗	SD7	B2	⊗	RESETDRV
1	⊗	GND	1	⊗	GND	A3	⊗	SD6	B3	⊗	+5V
2	⊗	no connection	2	⊗	+5V	A4	⊗	SD5	B4	⊗	IRQ9
3	⊗	no connection	3	⊗	TRIGGER*	A5	⊗	SD4	B5	⊗	-5V (not used)
4	⊗	Vbatt	4	⊗	STOP*	A6	⊗	SD3	B6	⊗	DRQ2
						A7	⊗	SD2	B7	⊗	-12V (not used)
						A8	⊗	SD1	B8	⊗	0WS#
D0	⊗	GND	C0	⊗	GND	A9	⊗	SD0	B9	⊗	+12V (not used)
D1	⊗	MEMCS16#	C1	⊗	SBHE#	A10	⊗	IOCHRDY	B10	⊗	(KEY)
D2	⊗	IOCS16#	C2	⊗	LA23	A11	⊗	AEN	B11	⊗	SMEMW#
D3	⊗	IRQ10	C3	⊗	LA22	A12	⊗	SA19	B12	⊗	SMEMR#
D4	⊗	IRQ11	C4	⊗	LA21	A13	⊗	SA18	B13	⊗	IOW#
D5	⊗	IRQ12	C5	⊗	LA20	A14	⊗	SA17	B14	⊗	IOR#
D6	⊗	IRQ15	C6	⊗	LA19	A15	⊗	SA16	B15	⊗	DACK3#
D7	⊗	IRQ14	C7	⊗	LA18	A16	⊗	SA15	B16	⊗	DRQ3
D8	⊗	DACK0#	C8	⊗	LA17	A17	⊗	SA14	B17	⊗	DACK1#
D9	⊗	DRQ0	C9	⊗	MEMR#	A18	⊗	SA13	B18	⊗	DRQ1
D10	⊗	DACK5#	C10	⊗	MEMW#	A19	⊗	SA12	B19	⊗	REFRESH#
D11	⊗	DRQ5	C11	⊗	SD8	A20	⊗	SA11	B20	⊗	SYSCLK
D12	⊗	DACK6#	C12	⊗	SD9	A21	⊗	SA10	B21	⊗	IRQ7
D13	⊗	DRQ6	C13	⊗	SD10	A22	⊗	SA9	B22	⊗	IRQ6
D14	⊗	DACK7#	C14	⊗	SD11	A23	⊗	SA8	B23	⊗	IRQ5
D15	⊗	DRQ7	C15	⊗	SD12	A24	⊗	SA7	B24	⊗	IRQ4
D16	⊗	+5V	C16	⊗	SD13	A25	⊗	SA6	B25	⊗	IRQ3
D17	⊗	MASTER#	C17	⊗	SD14	A26	⊗	SA5	B26	⊗	DACK2#
D18	⊗	GND	C18	⊗	SD15	A27	⊗	SA4	B27	⊗	TC
D19	⊗	GND	C19	⊗	(KEY)	A28	⊗	SA3	B28	⊗	BALE
						A29	⊗	SA2	B29	⊗	+5V
						A30	⊗	SA1	B30	⊗	OSC
						A31	⊗	SA0	B31	⊗	GND
						A32	⊗	GND	B32	⊗	GND

Tab. 8   PC/104 Bus Connectors PA/PB, PC/PD

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3 Hardware Description

3.1. Overview

Fig. 3   Board Layout

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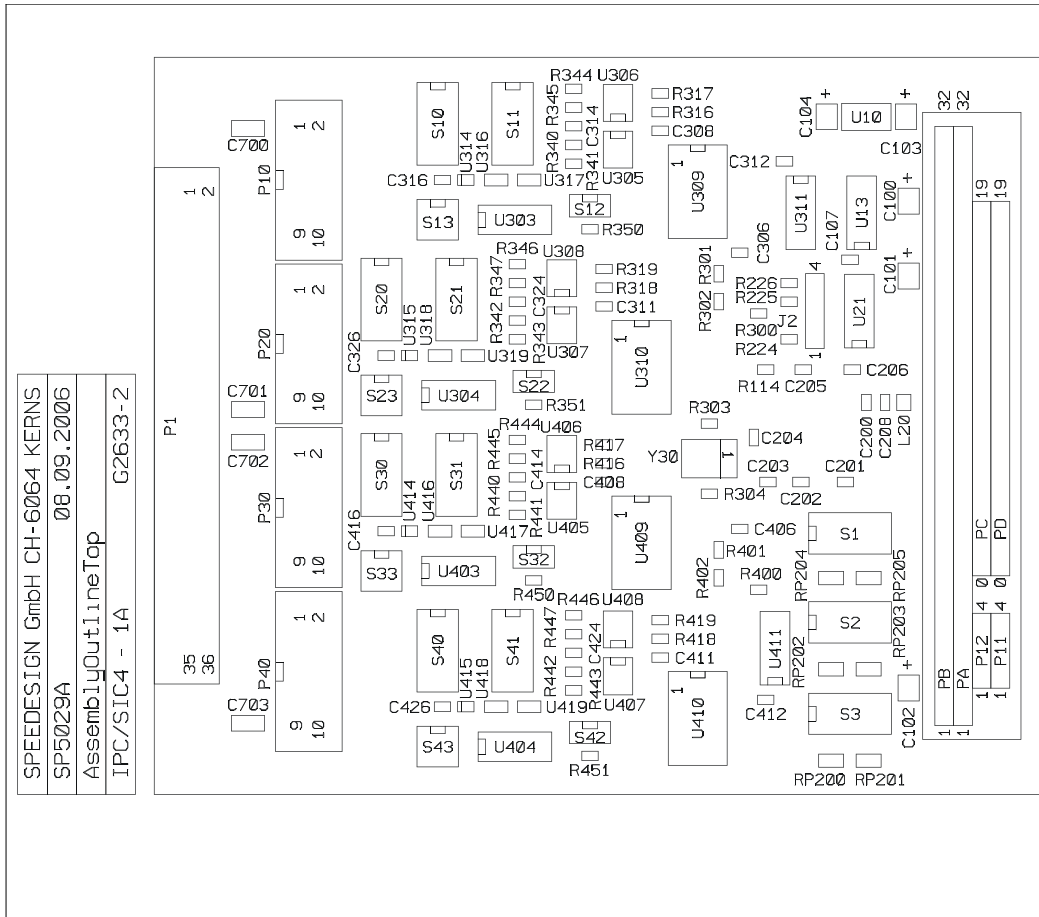
3.2. Memory and I/O Resources

3.2.1. General Memory Layout and Configuration

The IPC/SIC4 board does not use any memory resources.

3.2.2. General I/O Layout and Configuration

Address	Device / Register	Remarks
Status Base + 00..03H	Control/Status Registers	
Status Base + 04..07H	ID Registers	
COM A Base + 00..07H	UART Channel A Registers	see UART datasheet
COM B Base + 00..07H	UART Channel B Registers	see UART datasheet
COM C Base + 00..07H	UART Channel C Registers	see UART datasheet
COM D Base + 00..07H	UART Channel D Registers	see UART datasheet

Tab. 9   I/O Address Space Layout

3.2.3. Board Base Address Configuration

The base address of the IPC/SIC4 can be selected in the range 0x100..0x3FF and some standard COM port address combination according to Tab. 9/10 and Tab. 11. The IPC/SIC4 board uses a block of 4x8 bytes and a block of 8 bytes in the I/O space, starting at the configured base address according to Tab. 9/10 or five blocks of 8 bytes in the I/O space according to Tab. 11. The base address is defined by setting the sliders of switch S3. Several IPC/SIC4 boards (with different base addresses !) can be used in the same system.

CAUTION: Each board in the IPC system must have its own, unique address range. Overlapping address ranges may damage the boards.

Switch S3 / No address line	8 -	7 A15	- A14	- A13	- A12	- A11	- A10	6 A9	5 A8	4 A7	3 A6	2 A5	1 A4	A3..0
I/O address														
0x0100	cfg	0	0	0	0	0	0	on	off	on	on	on	x	0
0x0120	cfg	0	0	0	0	0	0	on	off	on	on	off	x	0
..		0	0	0	0	0	0						x	0
0x01E0	cfg	0	0	0	0	0	0	on	off	off	off	off	x	0
0x0200	cfg	0	0	0	0	0	0	off	on	on	on	on	x	0
0x0220	cfg	0	0	0	0	0	0	off	on	on	on	off	x	0
..		0	0	0	0	0	0						x	0
0x03E0	cfg	0	0	0	0	0	0	off	off	off	off	off	x	0

Tab. 10 Switch to Address resolution (S3)

Note: Switch off: 1

Switch on: 0

cfg: depending of address configuration

Switch S3 / No address line	8 -	7 A15	6 A9	5 A8	4 A7	3 A6	2 A5	1 A4	COM A	COM B	COM C	COM D	Status
configuration													
	off	on	on	off	on	on	on	on	0x100	0x108	0x110	0x118	0x200
	off	on	on	off	on	on	on	off	0x100	0x108	0x110	0x118	0x210
	off	on	on	off	on	on	off	on	0x120	0x128	0x130	0x138	0x220
	off	on	on	off	on	on	off	off	0x120	0x128	0x130	0x138	0x230
..	off	on	on	off	..	..	..	..	..	..	..	..	..
	off	on	on	off	off	off	off	on	0x1E0	0x1E8	0x1F0	0x1F8	0x2E0
	off	on	on	off	off	off	off	off	0x1E0	0x1E8	0x1F0	0x1F8	0x2F0
	off	on	off	on	on	on	on	on	0x200	0x208	0x210	0x218	0x100
	off	on	off	on	on	on	on	off	0x200	0x208	0x210	0x218	0x110
..	off	on	off	on	..	..	..	..	..	..	..	..	..
	off	on	off	on	off	off	off	on	0x2E0	0x2E8	0x2F0	0x2F8	0x1E0
	off	on	off	on	off	off	off	off	0x2E0	0x2E8	0x2F0	0x2F8	0x1F0
	off	on	off	off	on	on	on	on	0x300	0x308	0x310	0x318	0x200
	off	on	off	off	on	on	on	off	0x300	0x308	0x310	0x318	0x210
..	off	on	off	off	..	..	..	..	..	..	..	..	..
	off	on	off	off	off	off	off	on	0x3E0	0x3E8	0x3F0	0x3F8	0x2E0
	off	on	off	off	off	off	off	off	0x3E0	0x3E8	0x3F0	0x3F8	0x2F0

Tab. 11 Base Address Configuration (common base, below 0x400)

Switch S3 / No address line	8 -	7 A15	6 A9	5 A8	4 A7	3 A6	2 A5	1 A4	COM A	COM B	COM C	COM D	Status
configuration													
	off	off	on	off	on	on	on	on	0x8100	0x8108	0x8110	0x8118	0x8200
	off	off	on	off	on	on	on	off	0x8100	0x8108	0x8110	0x8118	0x8210
	off	off	on	off	on	on	off	on	0x8120	0x8128	0x8130	0x8138	0x8220
	off	off	on	off	on	on	off	off	0x8120	0x8128	0x8130	0x8138	0x8230
..	off	off	on	off	..	..	..	..	..	..	..	..	..
	off	off	on	off	off	off	off	on	0x81E0	0x81E8	0x81F0	0x81F8	0x82E0
	off	off	on	off	off	off	off	off	0x81E0	0x81E8	0x81F0	0x81F8	0x82F0
	off	off	off	on	on	on	on	on	0x8200	0x8208	0x8210	0x8218	0x8100
	off	off	off	on	on	on	on	off	0x8200	0x8208	0x8210	0x8218	0x8110
..	off	off	off	on	..	..	..	..	..	..	..	..	..
	off	off	off	on	off	off	off	on	0x82E0	0x82E8	0x82F0	0x82F8	0x81E0
	off	off	off	on	off	off	off	off	0x82E0	0x82E8	0x82F0	0x82F8	0x81F0
	off	off	off	off	on	on	on	on	0x8300	0x8308	0x8310	0x8318	0x8200
	off	off	off	off	on	on	on	off	0x8300	0x8308	0x8310	0x8318	0x8210
..	off	off	off	off	..	..	..	..	..	..	..	..	..
	off	off	off	off	off	off	off	on	0x83E0	0x83E8	0x83F0	0x83F8	0x82E0
	off	off	off	off	off	off	off	off	0x83E0	0x83E8	0x83F0	0x83F8	0x82F0

Tab. 12 Base Address Configuration (common base, above 0x8000)

Switch S3 / No	8	7	6	5	4	3	2	1	COM A	COM B	COM C	COM D	Status
address line	-	-	A9	A8	A7	A6	A5	A4					
configuration													
0	on	on	on	off	on	on	on	on	0x3F8	0x2F8	0x3E8	0x2E8	0x100
0	on	on	on	off	on	on	on	off	0x3F8	0x2F8	0x3E8	0x2E8	0x110
..	on	on	..	..	..	..	..	..	0x3F8	0x2F8	0x3E8	0x2E8	..
0	on	on	off	off	off	off	off	off	0x3F8	0x2F8	0x3E8	0x2E8	0x3F0
1	on	off	on	off	on	on	on	on	0x3E8	0x2E8	0x3A8	0x2A8	0x100
1	on	off	on	off	on	on	on	off	0x3E8	0x2E8	0x3A8	0x2A8	0x110
..	on	off	..	..	..	..	..	..	0x3E8	0x2E8	0x3A8	0x2A8	..
1	on	off	off	off	off	off	off	off	0x3E8	0x2E8	0x3A8	0x2A8	0x3F0

Tab. 13 Base Address Configuration (standard ports)

Note: Switch off: 1
             Switch on: 0

3.2.4. Interrupt Configuration

Switch No	S1	S1	S1	S1	S1	S1	S1	S1	S2	S2	S2	S2	S2	S2	S2	S2
Slider No	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1
IRQ/Channel		COM B				COMA				COM D				COM C		
no IRQ	on	on	on	on	on	on	on	on	on	on	on	on	on	on	on	on
IRQ3	on	on	off	off	on	on	off	off	on	on	off	off	on	on	off	off
IRQ4	on	off	on	on	on	off	on	on	on	off	on	on	on	off	on	on
IRQ5	on	off	on	off	on	off	on	off	on	off	on	off	on	off	on	off
IRQ6	on	off	off	on	on	off	off	on	on	off	off	on	on	off	off	on
IRQ7	on	off	off	off	on	off	off	off	on	off	off	off	on	off	off	off
IRQ9	off	on	on	off	off	on	on	off	off	on	on	off	off	on	on	off
IRQ10	off	on	off	on	off	on	off	on	off	on	off	on	off	on	off	on
IRQ11	off	on	off	off	off	on	off	off	off	on	off	off	off	on	off	off
IRQ15	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off

Tab. 14 Interrupt Configuration

3.2.5. Interface Configuration

The SIC4(T)-1BE has configurable interfaces. These are not available on the SIC4(T)-1AE which has fixed non-isolated RS232 interfaces.

Abbreviations:

- FD = Full Duplex
- HD = Half Duplex
- EC = Echo Cancellation
- TLS = special RS485 pin assignment according to "Technische Lieferbedingungen für Streckenstationen" Bundesanstalt für Strassenwesen, Deutschland.

Switch No	S10	S14									S12	
Slider No	87654321	654321	8	7	6	5	4	3	2	1	2	1
RS232 non isolated	all on	all on	off	off	off	off	off	off	off	off	off	off
RS232 isolated	all on	all off	off	off	off	off	off	off	off	off	off	off
RS422/485 FD	all off	all off	off	off	on	on	off	off	on	on	on	off
RS485 HD	all off	all off	on	on	off	off	off	off	on	on	on	off
RS485 HD EC	all off	all off	on	on	off	off	off	off	on	on	on	on
RS485 TLS	all off	all off	on	on	off	off	on	on	off	off	on	off
RS485 TLS EC	all off	all off	on	on	off	off	on	on	off	off	on	on

Tab. 15 COM A Interface Configuration

Switch No	S13				
Slider No	4	3	2	1	
RX Line Termination disabled	off	off	x	x	
RX Line Termination 100 Ohm	on	off	x	x	
RX Line Termination 120 Ohm	off	on	x	x	
RX Line Termination 55 Ohm	on	on	x	x	
TX Level Resistors disabled	x	x	off	off	470 Ohm Pullup/down
TX Level Resistors enabled	x	x	on	on	470 Ohm Pullup/down

Tab. 16 COM A RS422/485 Line Termination

Switch No	S20	S24			S21							S22	
Slider No	87654321	654321	8	7	6	5	4	3	2	1	2	1
RS232 non isolated	all on	all on	off	off	off	off	off	off	off	off	off	off
RS232 isolated	all on	all off	off	off	off	off	off	off	off	off	off	off
RS422/485 FD	all off	all off	off	off	on	on	off	off	on	on	on	off
RS485 HD	all off	all off	on	on	off	off	off	off	on	on	on	off
RS485 HD EC	all off	all off	on	on	off	off	off	off	on	on	on	on
RS485 TLS	all off	all off	on	on	off	off	on	on	off	off	on	off
RS485 TLS EC	all off	all off	on	on	off	off	on	on	off	off	on	on

Tab. 17 COM B Interface Configuration

Switch No			S23		
Slider No	4	3	2	1	
RX Line Termination disabled	off	off	x	x	
RX Line Termination 100 Ohm	on	off	x	x	
RX Line Termination 120 Ohm	off	on	x	x	
RX Line Termination 55 Ohm	on	on	x	x	
TX Level Resistors disabled	x	x	off	off	470 Ohm Pullup/down
TX Level Resistors enabled	x	x	on	on	470 Ohm Pullup/down

Tab. 18 COM B RS422/485 Line Termination

Switch No	S30	S34			S31							S32	
Slider No	87654321	654321	8	7	6	5	4	3	2	1	2	1
RS232 non isolated	all on	all on	off	off	off	off	off	off	off	off	off	off
RS232 isolated	all on	all off	off	off	off	off	off	off	off	off	off	off
RS422/485 FD	all off	all off	off	off	on	on	off	off	on	on	on	off
RS485 HD	all off	all off	on	on	off	off	off	off	on	on	on	off
RS485 HD EC	all off	all off	on	on	off	off	off	off	on	on	on	on
RS485 TLS	all off	all off	on	on	off	off	on	on	off	off	on	off
RS485 TLS EC	all off	all off	on	on	off	off	on	on	off	off	on	on

Tab. 19 COM C Interface Configuration

Switch No			S33			
Slider No		4	3	2	1	
RX Line Termination disabled		off	off	x	x	
RX Line Termination 100 Ohm		on	off	x	x	
RX Line Termination 120 Ohm		off	on	x	x	
RX Line Termination 55 Ohm		on	on	x	x	
TX Level Resistors disabled		x	x	off	off	470 Ohm Pullup/down
TX Level Resistors enabled		x	x	on	on	470 Ohm Pullup/down

Tab. 20 COM C RS422/485 Line Termination

Switch No	S40	S44				S41						S42	
Slider No	87654321	654321	8	7	6	5	4	3	2	1	2	1
RS232 non isolated	all on	all on	off	off	off	off	off	off	off	off	off	off
RS232 isolated	all on	all off	off	off	off	off	off	off	off	off	off	off
RS422/485 FD	all off	all off	off	off	on	on	off	off	on	on	on	off
RS485 HD	all off	all off	on	on	off	off	off	off	on	on	on	off
RS485 HD EC	all off	all off	on	on	off	off	off	off	on	on	on	on
RS485 TLS	all off	all off	on	on	off	off	on	on	off	off	on	off
RS485 TLS EC	all off	all off	on	on	off	off	on	on	off	off	on	on

Tab. 21 COM D Interface Configuration

Switch No			S43			
Slider No		4	3	2	1	
RX Line Termination disabled		off	off	x	x	
RX Line Termination 100 Ohm		on	off	x	x	
RX Line Termination 120 Ohm		off	on	x	x	
RX Line Termination 55 Ohm		on	on	x	x	
TX Level Resistors disabled		x	x	off	off	470 Ohm Pullup/down
TX Level Resistors enabled		x	x	on	on	470 Ohm Pullup/down

Tab. 22 COM D RS422/485 Line Termination

4 Programming Information

4.1. Overview

The programming of the IPC/SIC4 board is done with standard I/O read and write operations. For detailled information refer to the CPU board's user documentation, firmware documentation and other related documents as listed in paragraph 1.3.

4.2. Register Model and Bit-Utilization

All registers of the IPC/SIC4 are located in the I/O address space. The register model is shown in Tab. 23 and the utilization of the individual bits is listed in Tab. 24 and 25.
For the programming of the UART registers see manufacturer datasheet (Exar XR16L2750).

4.3. Memory and I/O Resources

4.3.1. General Memory Layout and Configuration

The IPC/SIC4 board does not use any memory resources.

4.3.2. General I/O Layout and Configuration

Register Number	READ Registers	WRITE Registers
Status Base + 00H	Status Register	reserved
Status Base + 01H	Control Register	reserved
Status Base + 02H	Function ID Register	reserved
Status Base + 03H	Revision ID Register	reserved
Status Base + 04H	Option ID Register	reserved
Status Base + 05H	reserved	reserved
Status Base + 06H	Interrupt Configuration A/B	reserved
Status Base + 07H	Interrupt Configuration C/D	reserved
COM A Base + 00..07H	see UART datasheet	see UART datasheet
COM B Base + 00..07H	see UART datasheet	see UART datasheet
COM C Base + 00..07H	see UART datasheet	see UART datasheet
COM D Base + 00..07H	see UART datasheet	see UART datasheet

Tab. 23 I/O Address Space Layout

Register	Bit	Meaning	Programming
00H	D0	reserved	reserved
	D1	reserved	reserved
	D2	reserved	reserved
	D3	reserved	reserved
	D4	INTA* Interrupt COM A	= 0: interrupt from UART channel A
	D5	INTB* Interrupt COM B	= 0: interrupt from UART channel B
	D6	INTC* Interrupt COM C	= 0: interrupt from UART channel C
	D7	INTD* Interrupt COM D	= 0: interrupt from UART channel D
01H	D7..0	reserved	reserved
02H	D7..0	FID	function ID = 8EH
03H	D7..0	RID	revision ID (see table 30)
04H	D7..0	OID	option ID = 81H
05H	D7..0	reserved	reserved
06H	D3..0	COM A IRQ line selection	= switch S1 slider 4..1 (see table 14)
	D7..4	COM B IRQ line selection	= switch S1 slider 8..5 (see table 14)
07H	D3..0	COM C IRQ line selection	= switch S2 slider 4..1 (see table 14)
	D7..4	COM D IRQ line selection	= switch S2 slider 8..5 (see table 14)

Tab. 24 Utilization of the individual Bit (READ-Registers)

Register	Bit	Meaning	Programming
00H	D0..D7	reserved	reserved
01H	D0..D7	reserved	reserved
02H	D0-D7	reserved	reserved
03H	D0-D7	reserved	reserved
04H	D0-D7	reserved	reserved
05H	D0-D7	reserved	reserved
06H	D0-D7	reserved	reserved
07H	D0-D7	reserved	reserved

Tab. 25 Utilization of the individual Bit (WRITE-Registers)

5 Technical Data

5.1. General Electrical Data

Important Note

Do not operate the SIC4 board outside of the recommended operating conditions. Otherwise lifetime and performance will degrade.

Operating the board outside of the absolute maximum ratings may damage the hardware.

Absolute Maximum Ratings (over free-air temperature range)

Parameter	Symbol	min	nom	max	Unit
internal power supply voltage	Vcc	-0.5		5.5	Vdc
isolation logic to chassis (AC, 60s, 500m a.s.l., Ta=25°C)		1000			Vrms
isolation serial interfaces to chassis (AC, 60s, 500m a.s.l., Ta=25°C)		1000			Vrms
isolation logic to serial interface (-1BE only) (DC, 1s, 500m a.s.l., Ta=25°C)		1000			Vdc
isolation between serial interfaces (-1BE only) (DC, 1s, 500m a.s.l., Ta=25°C)		500			Vdc
creepage distance logic to chassis and PCB boarder		1.0			mm
creepage distance serial interfaces to chassis and PCB boarder		1.0			mm
creepage distance logic to serial interface (-1BE only)		2.0			mm
creepage distance between serial interfaces (-1BE only)		1.0			mm
storage temperature range	Tst	-40		90	°C

Tab. 26   General Absolute Maximum Ratings

Recommended Operating Conditions

parameter	symbol	min	nom	max	unit
logic supply voltage	Vcc	4.50	5.00	5.25	V
operating free air temperature **Note:** connectors should not be plugged or unplugged below -20°C	Ta	-40		85	°C

Tab. 27　　General Recommended Operating Conditions

Electrical Characteristics
(over recommended operating range, unless otherwise noted)

Parameter	Symbol	min	typ	max	Unit
logic supply current SIC4(T)-1AE (Vcc=5V, no external loads)	Icc		155	200	mA
logic supply current SIC4(T)-1BE (Vcc=5V, no external loads)	Icc		385	500	mA
full load power dissipation (worst case, including onboard process power dissipation)	Pmax			2.7	W

Tab. 28　　General Electrical Characteristics

Switching Characteristics (nominal conditions)

Parameter	Symbol	min	nom	max	
UART baud rate (16X sampling rate)		50		115200	Baud
UART baud rate (8X sampling rate, RS422/485 only)		100		230400	Baud

Tab. 29　　General Switching Characteristics

5.2. Mechanical Data

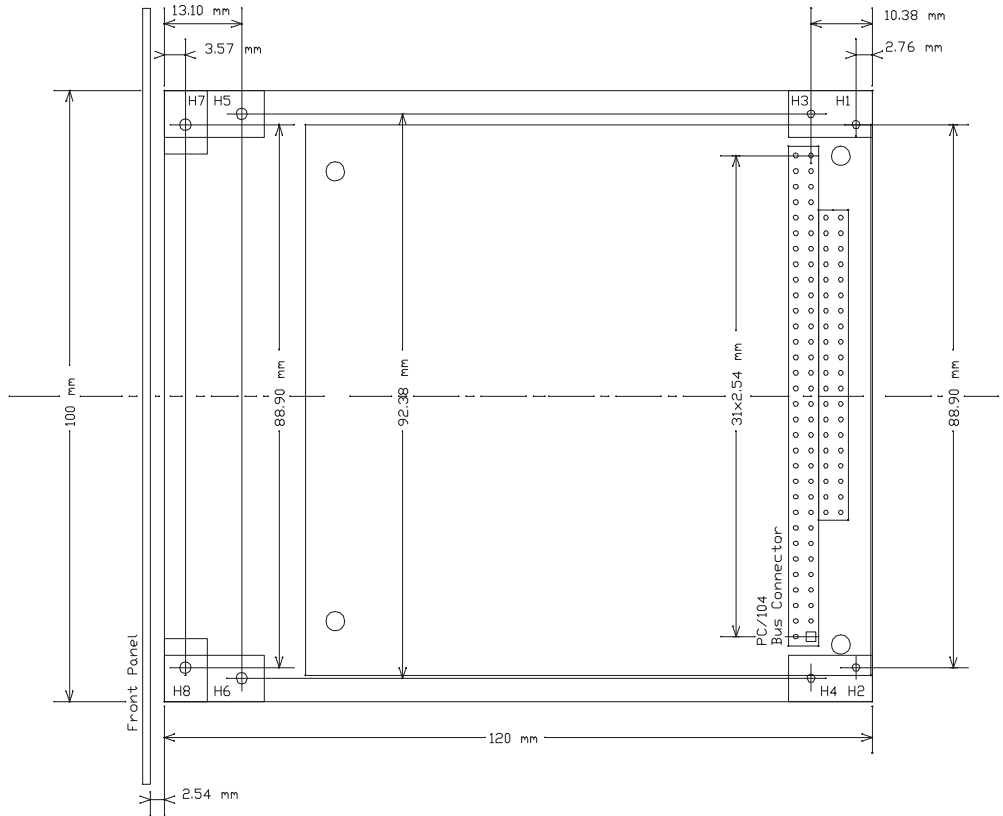
Fig. 4   Board Layout

6 Firmware

The SIC4 board does not contain any firmware, standard 16C550 drivers may be used with most applications.

7 Product Revision History

7.1. Hardware

This paragraph lists the different hardware revisions of the SIC4 boards delivered beginning with the first production lot. Note that prototyping boards are not included and must be returned to factory for upgrade or replacement. All information listed in this document relies on definitive state hardware. Therefore this information may be incompatible with the prototyping board hardware.

Important Note

This document always covers the newest product revision listed in Tab. 30.
Please contact the manufacturers technical support for upgrade options.

Board Identification (see product label)	Product Revision	Revision ID Register	Remarks
IPC/SIC4(T)-1AE #1	#1	03H	Original Release
IPC/SIC4(T)-1BE #1	#1	03H	Original Release

Tab. 30 Hardware Revision State

7.2. Firmware

The SIC4 board does not contain any firmware.

8 Manufacturer Information

8.1. Contact

Our distributors and system integrators will gladly give you any information about our products and their use. If you want to contact the manufacturer directly, please send a fax or email message containing a short description of your application and your request to the following address or use one of the information or technical support request forms on our internet homepage:

Syslogic Datentechnik AG
Taefernstr. 28
CH-5405 Baden-Daettwil / Switzerland

Email: support@syslogic.ch
www: http://www.syslogic.ch
Tel: +41 56 200 9040
Fax: +41 56 200 9050

8.2. Warranty

Our products are covered by a world-wide manufacturers warranty. The warranty period starts at the delivery time from our official distributor to the customer. The duration of the warranty period is specified in the respective product catalogs and the offers. All products carry a date code and a job number for identification. The manufacturing data and deliveries are registered in a high level Quality Management System.
The warranty covers material and manufacturing defects. All products must be returned via the official distributor to the factory for repair or replacement. The warranty expires immediately if the products are damaged of operation outside of the specified recommended operating conditions. The warranty also expires if the date code or job number listed on the product is altered or rendered unintelligible. The warranty does not include damage due to errors in firmware or software delivered with the products.