ESP360

Transition Module for IP-Comm360

Hardware Manual

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Changes in the chapters

The changes in the manual listed below affect changes in the *hardware* as well as changes in the *description* of facts only.

Chapter	Changes versus previous version
-	First English version.
-	-

Technical details are subject to change without further notice.

N O T E

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1. Overview

1.1 Module Description

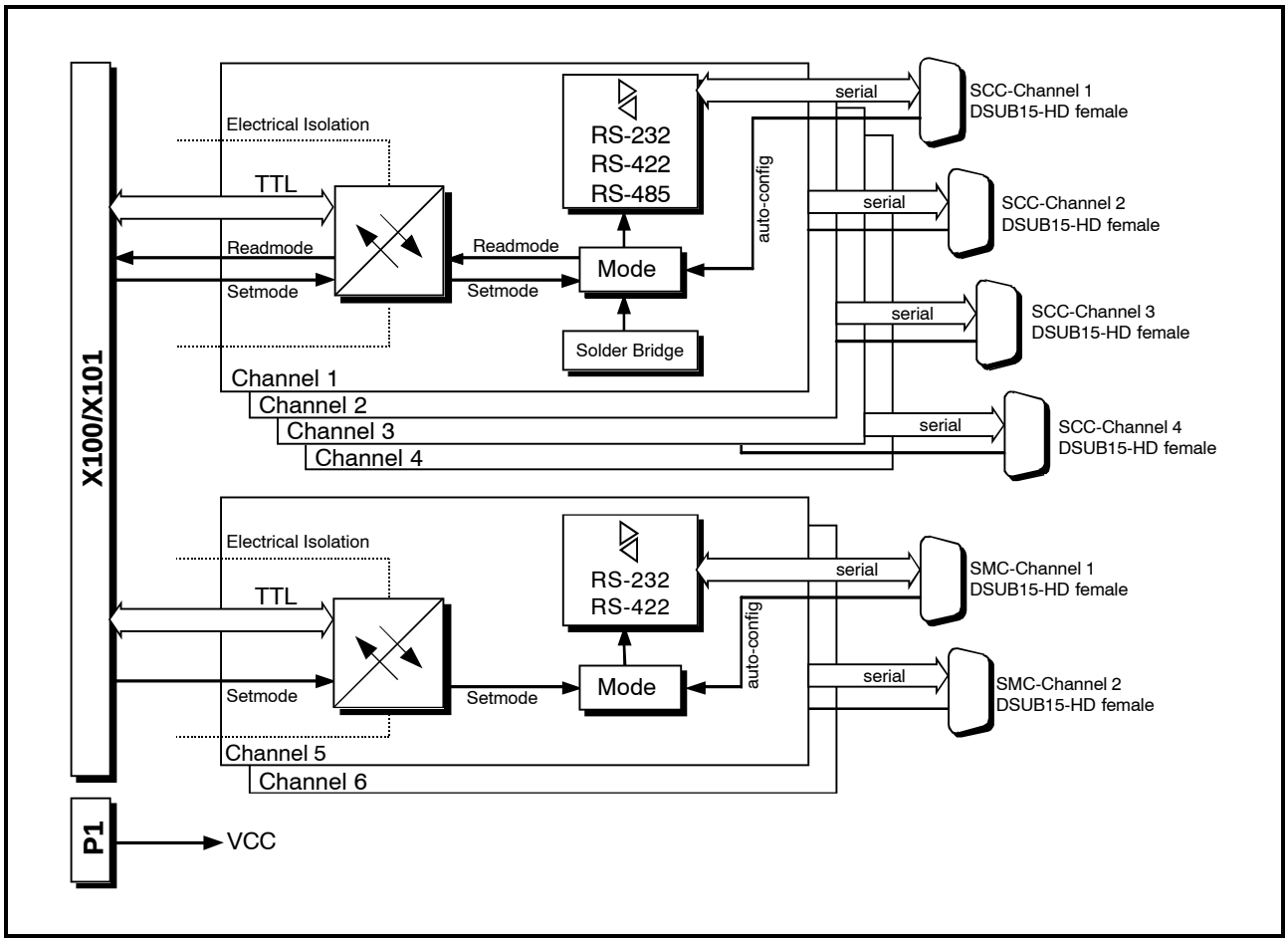


Fig. 1.1.1: Block-circuit diagram of the ESP360-module

The adapter board can realise six serial interfaces of the IndustryPack IP-Comm360. The adapter board is connected via 15-pin HD-DSUB sockets in the front panel. The IP-module is connected via a 50-pin flat-ribbon cable. Power is supplied via the P1-connector of the VMEbus. The module has to be installed close to the IP-module in the case, in order to ensure that the flat-ribbon cable can be connected correctly.

Each of the six serial interfaces on the ESP360-adapter is electrically insulated from the IP-module and the other interfaces. For this, optical couplers and DC/DC-converters are used. Four of the serial interfaces of the ESP360-module are connected to the internal SCC (Serial Communication Controller) of the 68360 on the IP-module IP-Comm360.
Two further interfaces are connected to the SMC (Serial Management Controller) of the 68360.

Overview

The design of the SCC-interface offers three physical interfaces: RS-232, RS-422 and RS-485. The user can select the physical interface via software, solder bridges or wired bridges in the connector of the serial line of the interface. The selected type of interface can be checked by means of software. Only RS-232 or RS-422-interfaces are available for the two SMC-interfaces.

The ESP360-adapter board has got a standard front panel of four TE width and six HE height.
An IEEE1101 front panel is available as an option. This front panel has been designed for a maximum HF-shield in connection with HF-shielded cases. Contact spring strips made from stainless steel have been designed for the connection to neighbouring front panels and to shield the gap between the front panels.

1.2 Summary of Technical Data

Name	ESP360
Suitable for module	IP-Comm360, esd-VME-ISER12
Power supply and GND-connection	+5V via P1
Connectors	P1 power supply via VMEbus (VG96-pin contact strip, DIN41612) X100/X101 interface for IP-module (50-pin contact strip) X200 ... X700 serial interface (15-pin HD-DSUB-socket)
Configuration	alternatively: via solder bridges, externally (bridge in connector) or via software
PCB dimensions	233.35 mm x 160.00 mm
Front panel	aluminium with chrome layer, 4TE wide, 6HE high, fastened by means of screws, optionally: IEEE1101-front panel
Max. permissible ambient temperature	0...50°C
Humidity	max. 90%, non-condensing
Electrical insulation of the serial interfaces from IP-module and each other	in accordance with VDE 0110b§8, isolation group C and installation in cubicle: 300 V(DC) / 250 V(AC)

Table 1.2.1: General data of the adapter boards

1.3 Order Information

Type	Features	Order No.
ESP360	Adapter module for IP-Comm360 incl. standard front panel	V.1129.01
ESP360-FP1101	Front panel in accordance with IEEE1101	V.1129.10
ESP360-FBK50	Flat-ribbon cable for IP-module *	V.1129.11
ESP360-ME	English manual	V.1129.21

Table 1.3.1: Order information

* The desired length and the position of the IP-Comm360-module on the CPU-board (Above or below) has to be stated in the order, because different flat-ribbon cables have to be used, depending on the position of the module. The flat-ribbon cables differ in length and the position of the post connectors at the ends of the cable.

2. PCB View and Configuration

2.1 Position of Jumpers

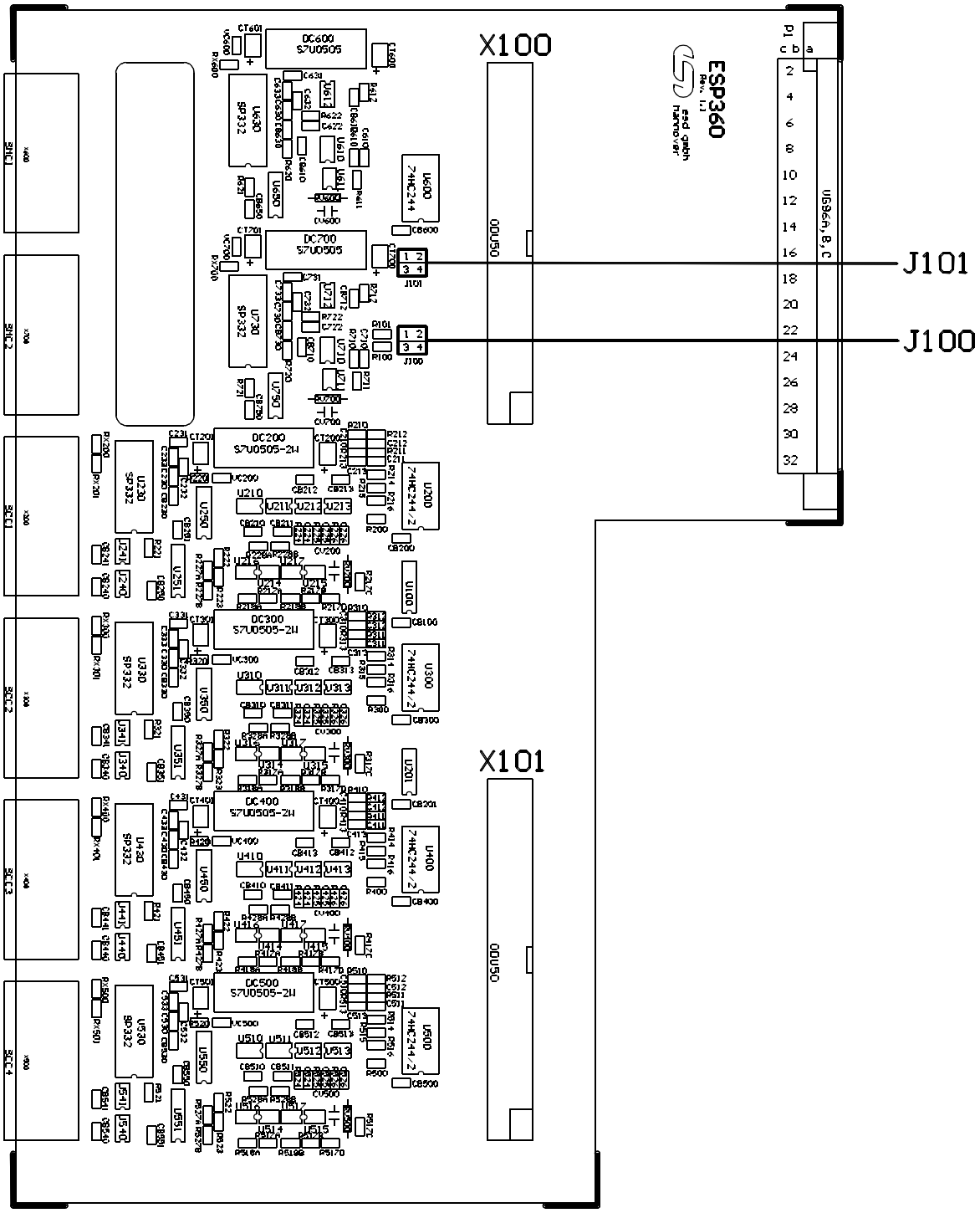


Fig. 1.4.1: Position of jumpers on the adapter board (component layer)

2.2 Position of Solder Bridges

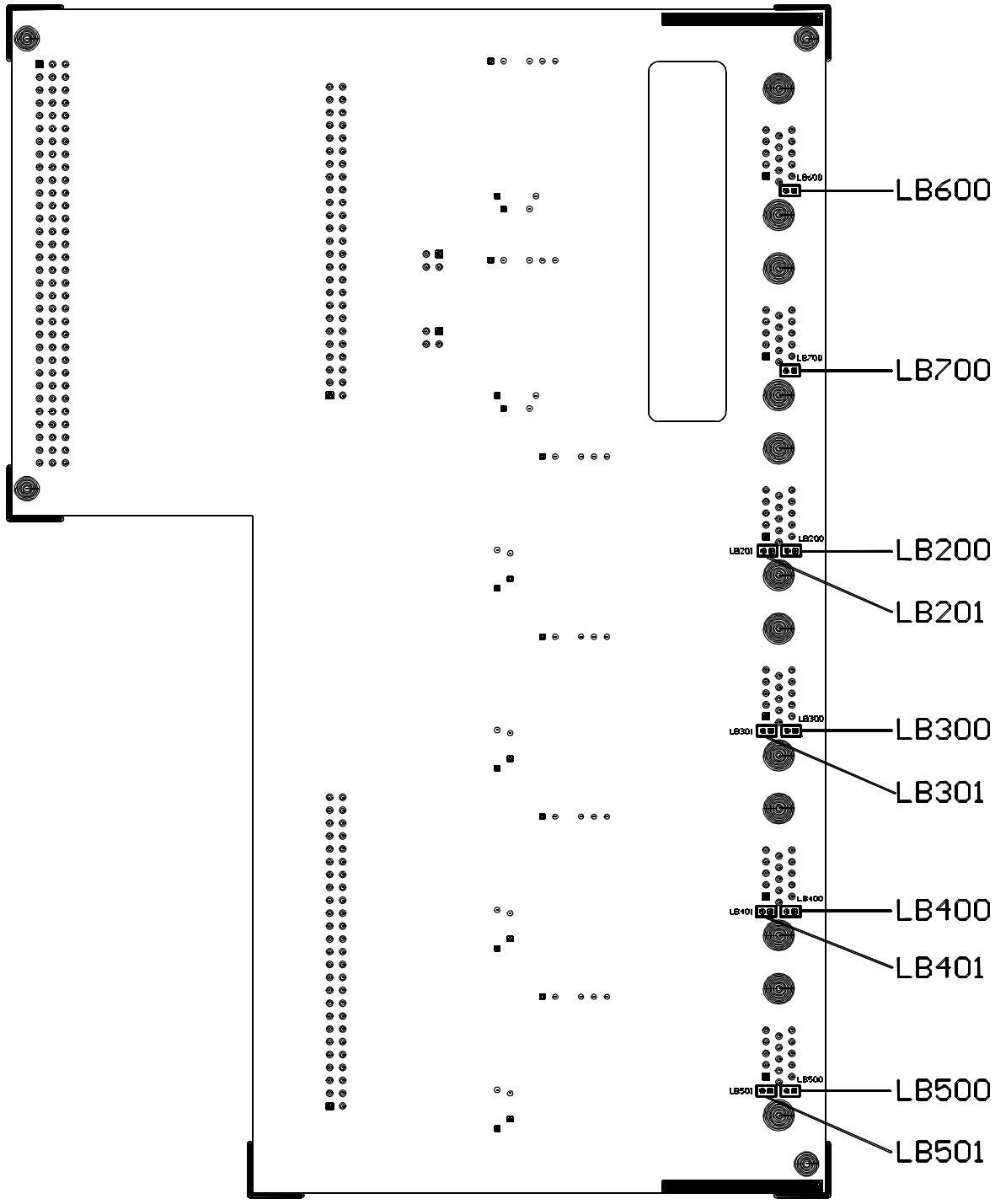
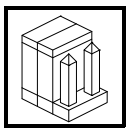


Fig. 1.4.2: Position of solder bridges on the adapter board (bottom layer)



2.3 Default Settings of Jumpers and Solder Bridges

Please refer to table 1.4.3. for the position of jumpers. The jumpers are represented below as seen by users, when they look at the board with the front panel pointing to the left and the component layer facing upwards.

Jumper	Function	Setting
J100/J101	Connection of clock generators for SMC1 and SMC2 or reading the configuration.	No clock generator, configuration reading is possible.

Table 1.4.1: Default setting of jumpers

Please refer to table 1.4.4 for the position of solder bridges. The solder bridges are described below as seen by users, when they look at the board with the front panel pointing to the right and the component layer facing downwards.

Solder bridge	Function	Setting
LB200 ... LB501	SCC1 ... SCC4 in RS-232-, RS-422- or RS-485-operation	External configuration via interface connector.
LB600 u. LB700	SMC1 and SMC2 in RS-232- or RS-422-operation.	External configuration via interface connector.

Table 1.4.2: Default settings of solder bridges

2.4 Function of Jumpers or Solder Bridges

2.4.1 Connecting Additional Clock Generators for SMC1 and SMC2 (J100, J101)

The micro controller 68360 on the IP-Comm360-module has got four internal clock generators. Therefore you can usually only set four different bit rates for the six serial interfaces. If it is necessary to run each interface with a different bit rate, two additional clock generators can be simulated via timer outputs of the micro controller. These can be configured via jumpers J100 and J101. In this process a timer output is reconnected to an input pin of the controller.

Only a limited number of controller ports is available on the ESP-360 adapter. Therefore, the reading function of the current interface configuration is not available when the two additional clock generators are activated.

The following figure represents the circuit of the controller ports with the jumpers:

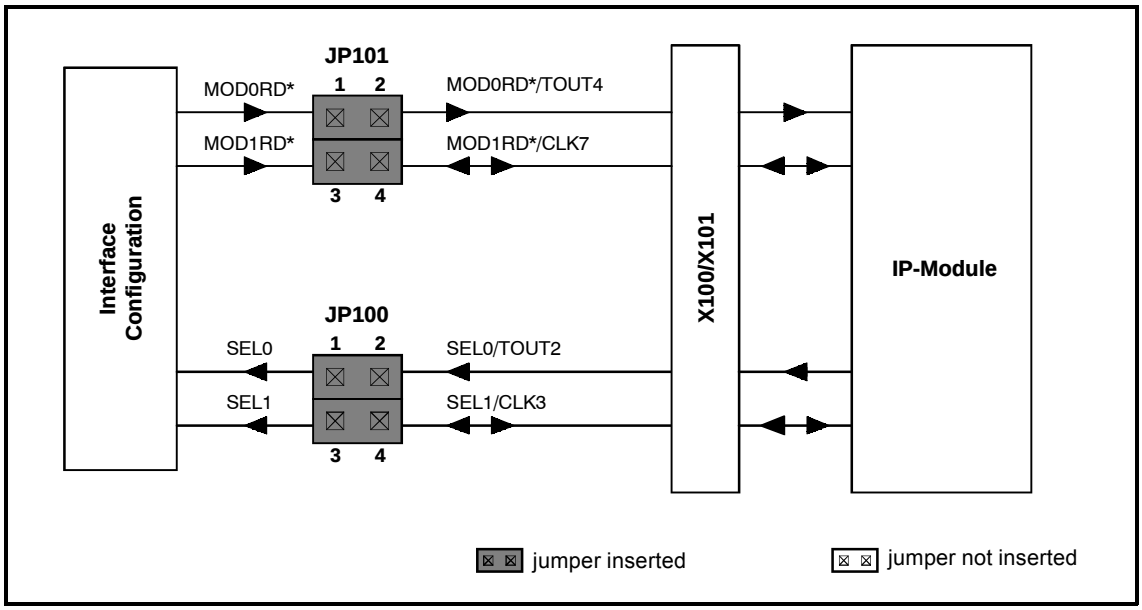


Fig. 1.4.3: Circuit diagram of jumpers in default setting

Jumpers J100 and J101 are evaluated together and must therefore be set on the same contacts. Via J100 the signals which select the channel whose configuration is to be read are connected. The configuration then actually acknowledges via J101.

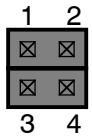
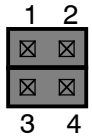
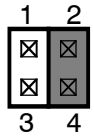
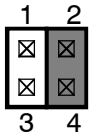
Position of jumpers	Function
J101  J100 	Reading the configuration of serial interfaces SCC1 ... SCC4 (default setting).
J101  J100 	CLK-reconnection for bit rate generator of serial interfaces SMC1 and SMC2.

Table 1.4.3: Permissible positions of jumpers

2.4.2 Configuration of Interfaces via LB200...LB700

The interfaces can either be configured via the solder bridges described below, via contacts of the interface connectors or by means of software via port pins of the micro controller 68360 on the IP-Comm360 module. As you can see in the following circuit diagram, the low level dominates. If, for instance, a configuration signal is connected to GND in the connector, the configurations made via the controller port or the solder bridges are then insignificant for this configuration bit.

The current configuration can be acknowledged in every case, unless jumpers J100 and J101 have been changed (see above).

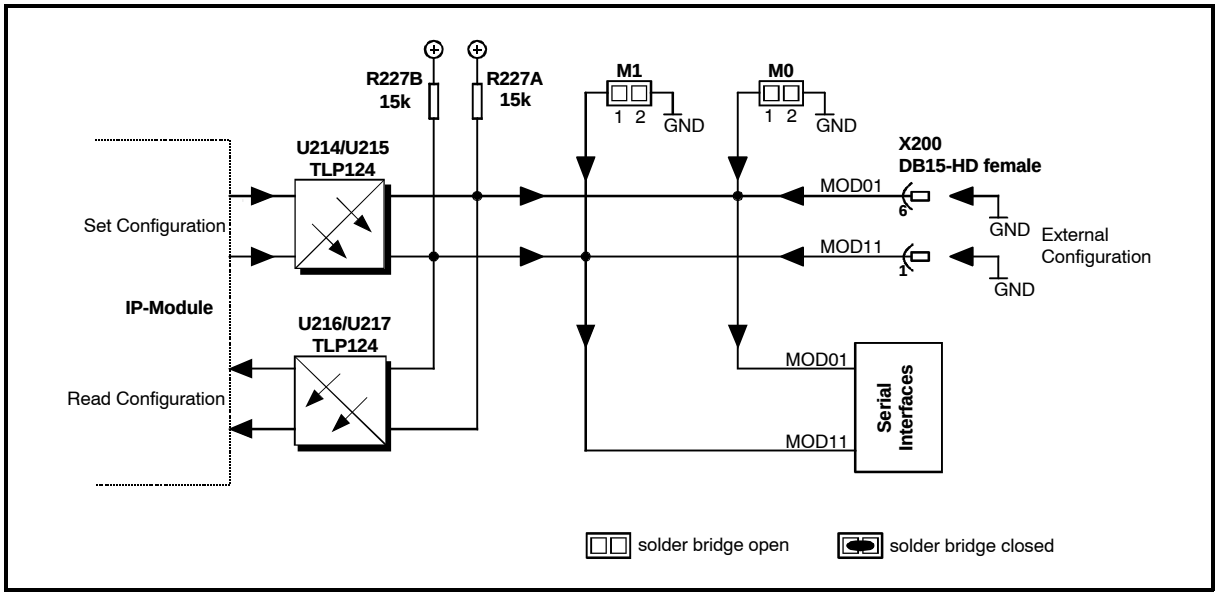
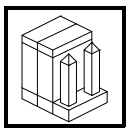


Fig. 1.4.4: Circuit diagram of solder bridges in default setting (example: channel SCC1)

Serial channel	Solder bridge
SMC 1 SMC 2	LB600 LB700
SCC 1 SCC 2 SCC 3 SCC 4	LB200, LB201 LB300, LB301 LB400, LB401 LB500, LB501

Table 1.4.4: Assignment of channels to solder bridges

The solder bridges are always near the interface connectors on the board bottom layer and are marked by **M0** and **M1** (refer to table on the following page).



The following table shows the status of the solder bridges and the assigned interface configuration. SMC-channels 1 and 2 have got only one solder bridge each, because here you can only choose between RS-232 and RS-422.

Solder bridges M1	Solder bridges M0	Mode	Interface
	 1 2	RS-232-operation or external configuration via interface connector.	SMC-channel 1 + 2
	 1 2	RS-422-operation	
 1 2	 1 2	RS-232-operation	SCC-channel 1 ... 4
 1 2	 1 2	RS-422-operation	
 1 2	 1 2	RS-485-operation	
 1 2	 1 2	External configuration via interface connector.	

 solder bridge open  solder bridge closed

Table 1.4.5: Permissible configurations of solder bridges

3. Signals of the Serial Interfaces

Below the wiring of the serial interfaces is represented. The figures are used to explain the tables listed in the appendix (chapter 4.3 Connector Assignments). The short names used for the signals will also be explained in the appendix (chapter 4.3.4 Signal Descriptions). Chapter 4.4 Circuit Diagrams, which can also be found in the appendix, contains the circuit diagrams of the ESP360.

3.1 SCC-Interfaces for RS-232-Operation

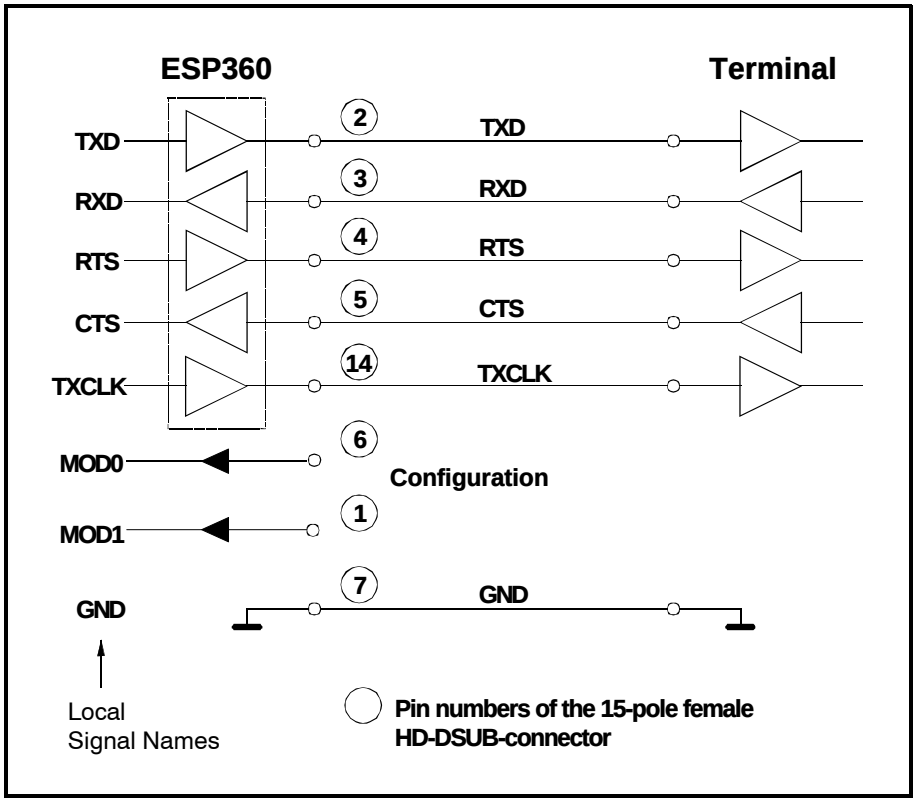


Fig. 2.1.1: Wiring circuit for RS-232-operation

3.2 SCC-Interfaces for RS-422-Operation

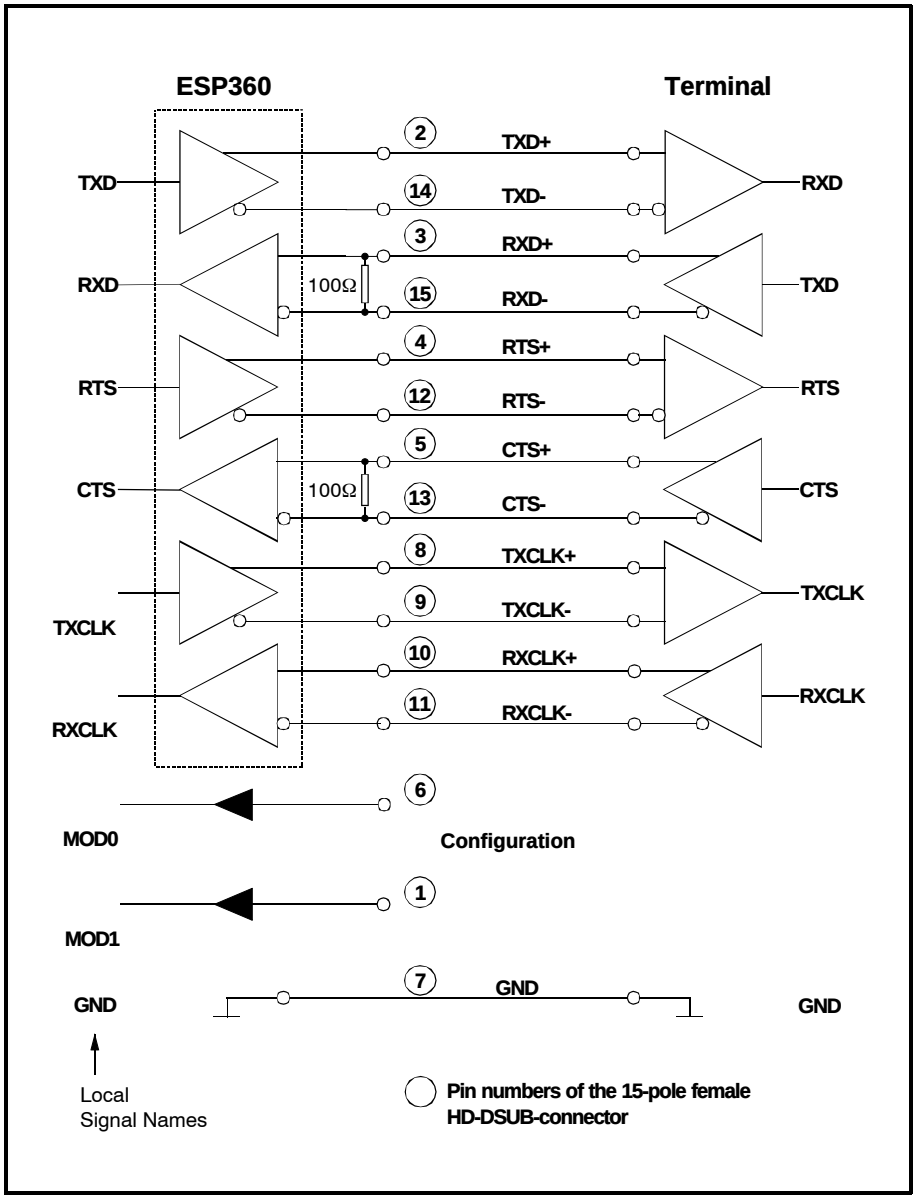


Fig. 2.2.1: Wiring diagram for RS-422-operation

3.3 SCC-Interfaces for RS-485-Operation

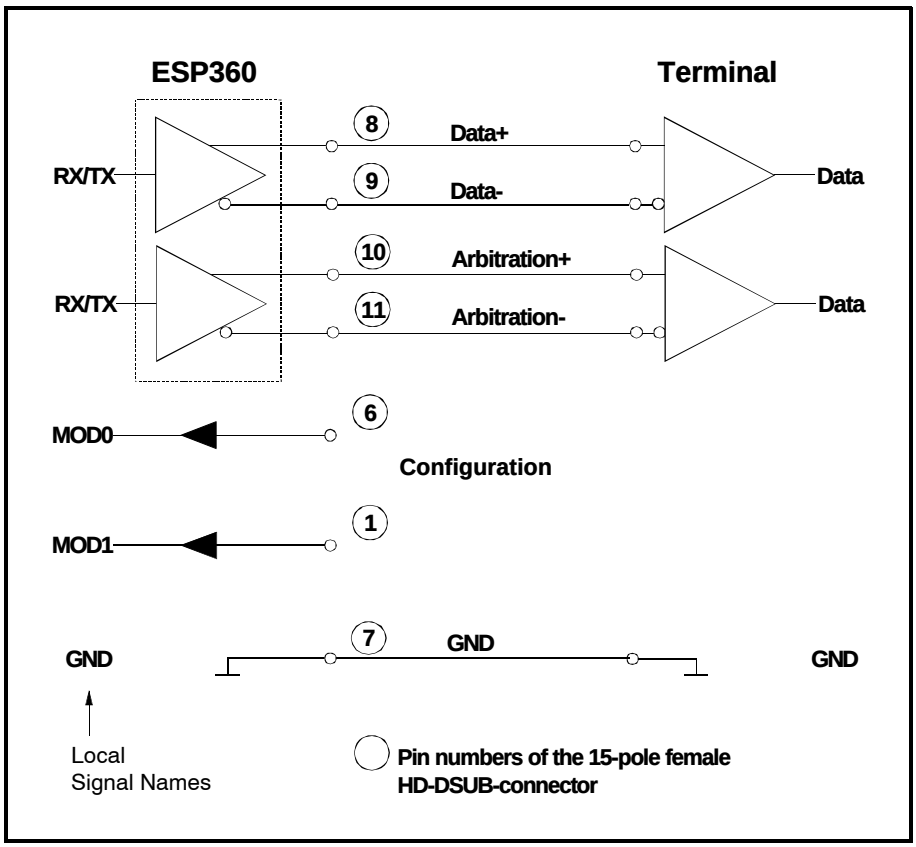


Fig. 2.3.1: Wiring diagram for RS-485-operation

3.4 SMC-Interfaces for RS-232-Operation

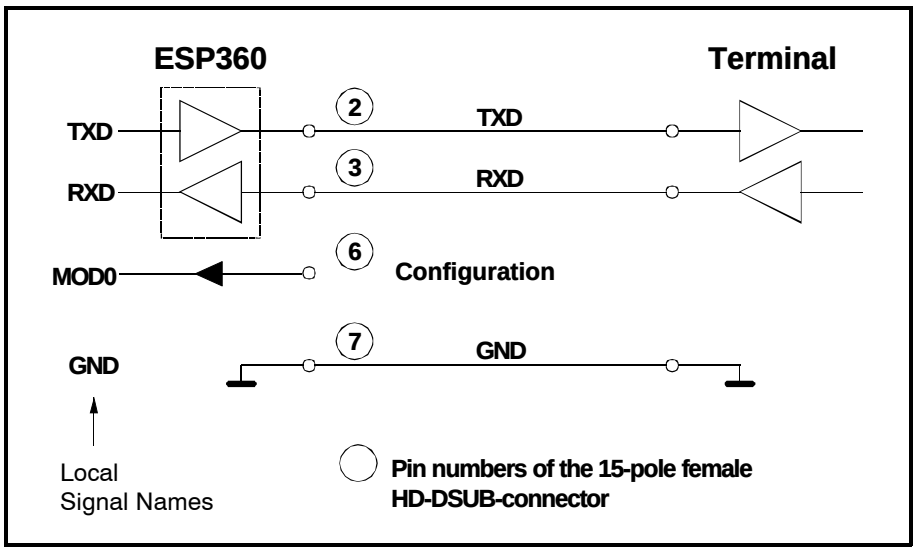


Fig. 2.4.1: Wiring diagram for RS-232-operation

3.5 SMC-Interfaces for RS-422-Operation

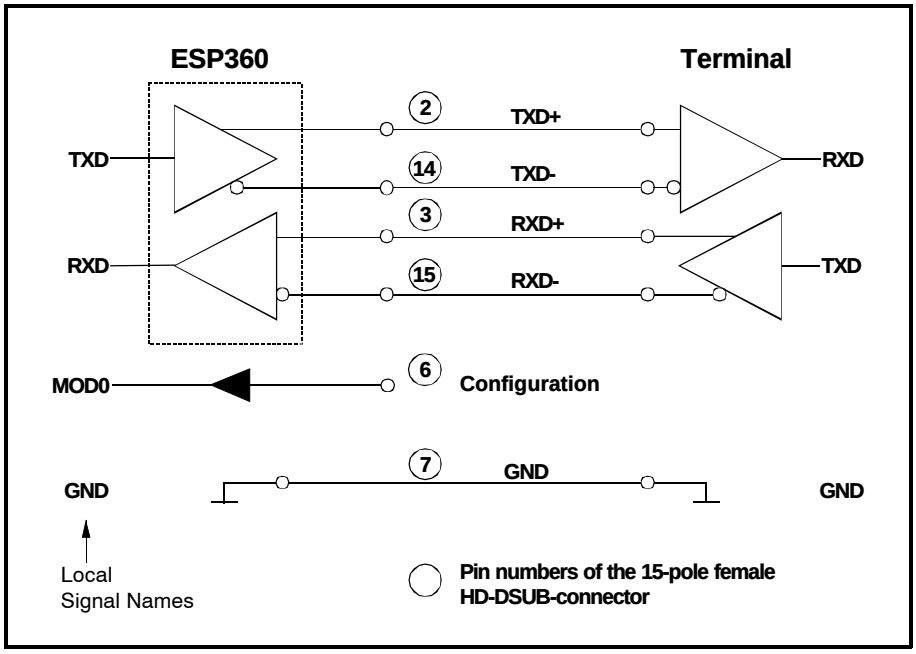


Fig. 2.5.1: Wiring diagram for RS-422-operation

4. Appendix

4.1 View of Front Panel with Sockets

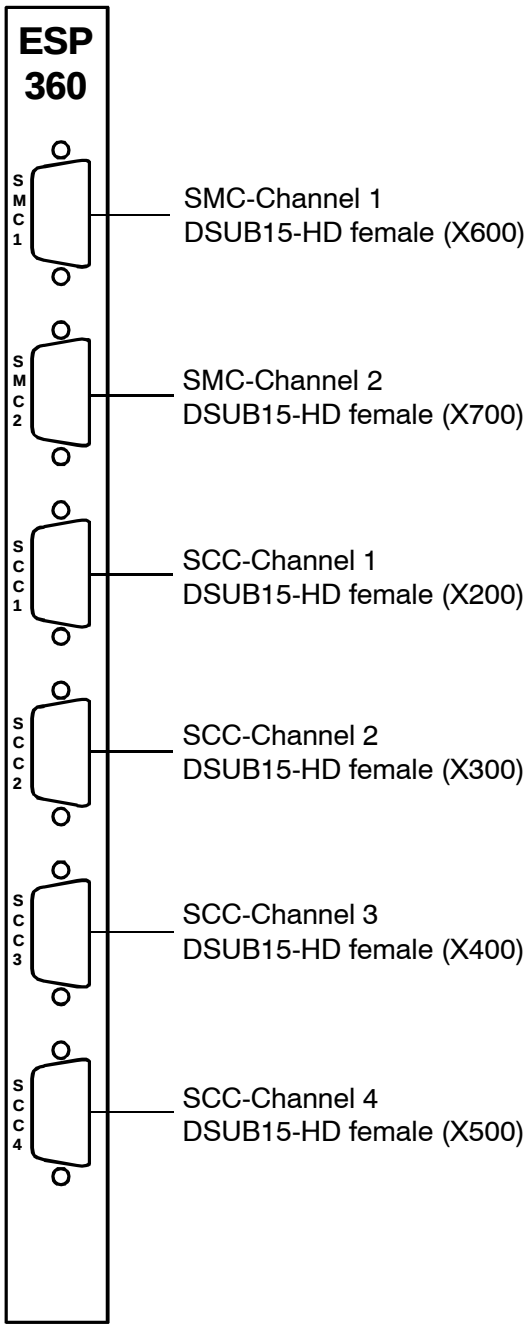


Fig.3.1.1: Front panel view

4.2 Connecting the Flat-Ribbon Cable

The ESP360-adapter board and the IP-Comm360-module are connected via a flat-ribbon cable. Depending on the position of the IP-module on the CPU-board the flat-ribbon cable is either connected to X100 or X101 of the ESP360-adpater.

The desired lenght and the position of the IP-Comm360 module on the CPU-board (top or bottom) has to be stated in the order, because depending on the position of the module, different flat-ribbon cables have to be used. The flat-ribbon cables differ in length and position of post connectors at the ends of the cable.

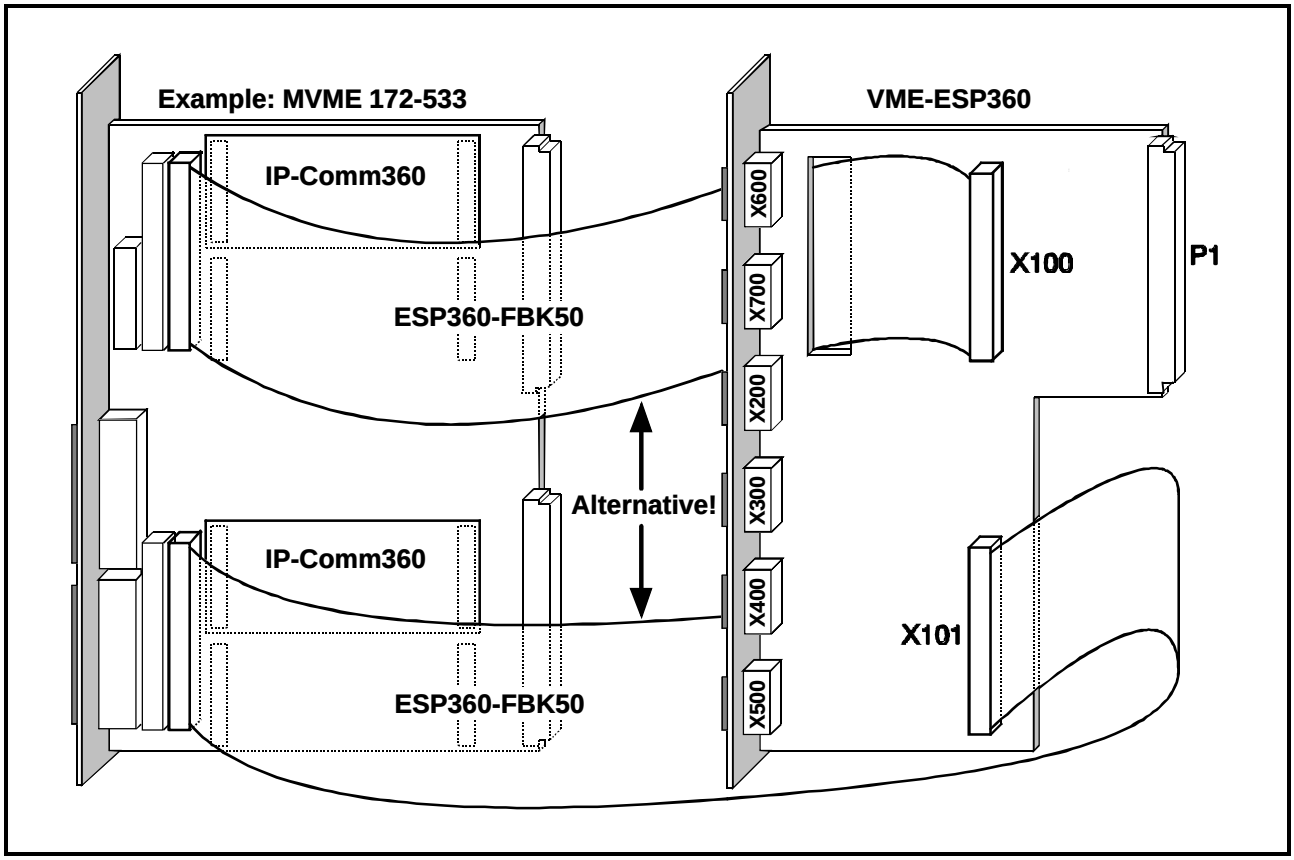
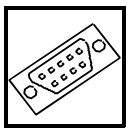


Fig. 3.2.1: Possible ways to connect the flat-ribbon cable (ESP360-FBK50), using the MVME 172-533 board as an example

Attention: The ESP360-board must only be connected to **one** IP-Comm360 module via **one** flat-ribbon cable. If two IP-modules were connected simultaneously, the signals of the IP-modules would be short-circuited on the ESP360-adapter!



4.3 Connector Assignments

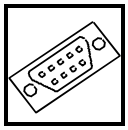
4.3.1 Transition Connector P1

Pin	Row A	Row B	Row C
1	-	-	-
2	-	-	-
3	-	-	-
4	-	BG0IN*	-
5	-	BG0Out*	-
6	-	BG1IN*	-
7	-	BG1OUT*	-
8	-	BG2IN*	-
9	GND	BG2OUT*	GND
10	-	BG3IN*	-
11	GND	BG3OUT*	-
12	-	-	-
13	-	-	-
14	-	-	-
15	GND	-	-
16	-	-	-
17	GND	-	-
18	-	-	-
19	GND	-	-
20	-	GND	-
21	IACKIN*	-	-
22	IACKOUT*	-	-
23	-	GND	-
24	-	-	-
25	-	-	-
26	-	-	-
27	-	-	-
28	-	-	-
29	-	-	-
30	-	-	-
31	-	-	-
32	VCC	VCC	VCC

Table 3.3.1: Female connector in accordance with DIN41612 design VG96 A/B/C

-... signal is not connected

Signals BGxIN* have been bridged with the corresponding signals BGxOUT* (x=0, 1, 2, 3) on the board. IACKIN* has been bridged with IACKOUT*.



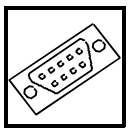
Connector Assignment

4.3.2 Transition Connector X100/X101

Signal	Pin		Signal
RXD1	1	2	MOD0WR1*
TXD1	3	4	MOD0WR2*
RXCLK1	5	6	GND
RXCLK2	7	8	RTS1*
SEL1/CLK3	9	10	RTS2*
SEL0/TOUT2	11	12	RTS3*
RXCLK3	13	14	RTS4*
RXCLK4	15	16	CTS1*
RXD2	17	18	DIR1*
TXD2	19	20	CTS2*
MOD1RD*/CLK7	21	22	GND
MOD0RD*/TOUT4	23	24	DIR2*
MOD1WR1*	25	26	-
SMRXD2	27	28	CTS3*
SMTXD1	29	30	RXD3
SMRXD1	31	32	TXD3
DIR3*	33	34	TXCLK1
CTS4*	35	36	TXCLK2
DIR4*	37	38	SMLEV1*
TXCLK3	39	40	GND
SMLEV2*	41	42	MOD1WR4*
RXD4	43	44	MOD0WR4*
TXD4	45	46	MOD1WR3*
SMTXD2	47	48	MOD0WR3*
MOD1WR2*	49	50	TXCLK4

Table 3.3.2: 50-pin male connector

-... signal is not connected



4.3.3 Serial Interfaces

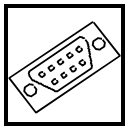
The signal assignments are for all SCC-interfaces (X200, X300, X400, X500) or SMC-interfaces (X600, X700).

4.3.3.1 SCC-Interfaces for RS-232-Opration

Pin	Signal	Data direction of CPU
1	MOD1	input/output
2	TXD	output
3	RXD [1)]	input
4	RTS	output
5	CTS [2)]	input
6	MOD0	input/output
7	GND	
8	-R-	
9	-R-	
10	-R-	
11	-R-	
12	-Z-	
13	-Z- [2)]	
14	TXCLK	output
15	-Z- [1)]	

Table 3.3.3: 15-pin HD-DSUB-female

[1,2)]... 100 Ohm termination between these lines



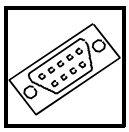
Connector Assignment

4.3.3.2 SCC-Interfaces for RS-422-Operation

Pin	Signal	Data direction of CPU
1	MOD1	input/output
2	TXD+	output
3	RXD+ [1)]	input
4	RTS+	output
5	CTS+ [2)]	input
6	MOD0	input/output
7	GND	-
8	TXCLK+	output
9	TXCLK-	output
10	RXCLK+	input
11	RXCLK-	input
12	RTS-	output
13	CTS- [2)]	input
14	TXD-	output
15	RXD- [1)]	input

Table 3.3.4: 15-pin HD-DSUB-female

[1,2)]... 100 Ohm termination between these lines

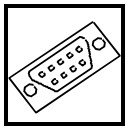


4.3.3.3 SCC-Interfaces for RS-485-Operation

Pin	Signal
1	MOD1
2	-Z-
3	-Z- [1)]
4	-Z-
5	-Z- [2)]
6	MOD0
7	GND
8	Data+
9	Data-
10	Arbitration+
11	Arbitration-
12	-Z-
13	-Z- [2)]
14	-Z-
15	-Z- [1)]

Table 3.3.5: 15-pin HD-DSUB-female

[1,2)... 100 Ohm termination between these lines



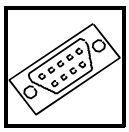
Connector Assignment

4.3.3.4 SMC-Inerfaces for RS-232-Operation

Pin	Signal	Data direction of CPU
1	-	
2	TXD	output
3	RXD	input
4	-	
5	-	
6	MOD0	input/output
7	GND	
8	-	
9	-	
10	-	
11	-	
12	-	
13	-	
14	-	
15	-	

Table 3.3.6: 15-pin HD-DSUB-female

-... signal is not connected

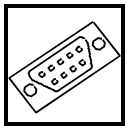


4.3.3.5 SMC-Interfaces for RS-422-Operation

Pin	Signal	Data direction of CPU
1	-	
2	TXD+	output
3	RXD+	input
4	-	
5	-	
6	MOD0	input/output
7	GND	
8	-	
9	-	
10	-	
11	-	
12	-	
13	-	
14	TXD-	output
15	RXD-	input

Table 3.3.7: 15-pin HD-DSUB-socket

-... signal is not connected

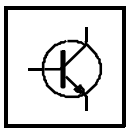


Connector Assignment

4.3.4 Signal Description of Serial Interfaces (SCC/SMC)

TXD, RXD	data signals RS-232
RTS, CTS	control signals RS-232
TXD+/TXD- RXD+/RXD-	data signals RS-422
RTS+/RTS- CTS+/CTS-	control signals RS-422
TXCLK/RXCLK	synchronisation signals RS-232
TXCLK+/TXCLK- RXCLK+/RXCLK-	synchronisation signals RS-422
MOD0/MOD1	configuration inputs
-Z-	high-impedance output (no signal)
-R-	RS-485-component set to Receive
Daten+/Daten-	data signals RS-485
Arbitrierung+/ Arbitrierung-	control signals RS-485

Table 3.3.8: Signal descriptions of serial interfaces



4.4 Circuit Diagrams