MicroSys

User's Manual

IO485/422 Rev. 4

2nd edition

Declaration of Conformity

We, Manufacturer
MicroSys Electronics GmbH
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declare that the product

IO 485

is in conformity with:

EN 50081-1 Generic emission standard
EN 50082-1 Generic immunity standard

in accordance with **89/336 EEC-EMC** Directive.

We also declare the conformity of the above mentioned product with the actual required safety standards in accordance with Low Voltage Directive **73/23 EEC**.

Date:

Signature:

Position: General Manager

Edition

	Date:	Ident-Nr.:	Released:
Manual Description of RJ45 connector added.	16.12.03	EW186MA-04AB	
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1. Short Description

The IO485 board is an universal I/O module for adding RS422 or RS485 buffers to almost all serial interfaces on MicroSys products.
This small piggy back can easily be plugged into the corresponding 22 pin sockets, e.g. on CPU and SIO boards, by the user.
The IO485 module can be configured very flexible by solder links to cover different interface specifications.
The standard versions are described in this manual. The described reverse types allow a 1:1 connection between two systems without the need of a cross over cable.
Please check the availability with your MicroSys dealer.

2. IO422 Mode

PinOut of DSUB and RJ45 Connector

Pin	Signal DSUB	Signal RJ45
1	RxD+	RTS+
2	RxD-	RTS-
3	TxD-	GND
4	TxD+	TxD-
5	GND	RxD-
6	RTS+	RxD+
7	RTS-	CTS-
8	CTS-	TxD+
9	CTS+	

Link Combination

Link	Position
M0	1 - 2
M1	------
M2	1 - 2
M3	1 - 2
TXE	------
RTM	2 - 3
CTM	1 - 2

3. IO485 4-Wire Mode

PinOut of DSUB and RJ45 Connector

Pin	Signal DSUB	Signal RJ45
1	RxD+	*RTS*+
2	RxD-	*RTS*-
3	TxD-	GND
4	TxD+	TxD-
5	GND	RxD-
6	*RTS*+	RxD+
7	*RTS*-	------
8	------	TxD+
9	------	

TxD buffer is tristateable; RTS = low enables the transmit buffer.

Note! RTS buffer is driven by CTS line and is always enabled (not tristated) !

Link Combination

Link	Position
M0	1 - 2
M1	------
M2	1 - 2
M3	------
TXE	2 - 3
RTM	1 - 2
CTM	------

4. IO485 2-Wire Mode

PinOut of DSUB and RJ45 Connector

Pin	Signal DSUB	Signal RJ45
1	------	*RTS*+
2	------	*RTS*-
3	RxD- / TxD-	GND
4	RxD+ / TxD+	RxD- / TxD-
5	GND	------
6	*RTS*+	------
7	*RTS*-	------
8	------	RxD+ / TxD+
9	------	

TxD buffer is tristateable; RTS = low enables the transmit buffer.
RxD buffer is always enabled.

Note! RTS buffer is driven by CTS line and is always enabled (not tristated) !

Link Combination

Link	Position
M0	1 - 2
M1	1 - 2
M2	1 - 2
M3	------
TXE	2 - 3
RTM	1 - 2
CTM	------

5. IO422 Reverse Mode

PinOut of DSUB and RJ45 Connector

Pin	Signal DSUB	Signal RJ45
1	TxD +	CTS +
2	TxD -	CTS -
3	RxD -	GND
4	RxD +	RxD -
5	GND	TxD -
6	CTS +	TxD +
7	CTS -	RTS -
8	RTS -	RxD +
9	RTS +	

Link Combination

Link	Position
M0	2 - 3
M1	1 - 2
M2	------
M3	1 - 2
TXE	------
RTM	2 - 3
CTM	1 - 2

6. IO485 4-Wire Reverse Mode

PinOut of DSUB Connector

Pin	Signal DSUB	Signal RJ45
1	TxD +	------
2	TxD -	------
3	RxD -	GND
4	RxD +	RxD -
5	GND	TxD -
6	------	TxD +
7	------	*RTS* -
8	*RTS* -	RxD +
9	*RTS* +	

TxD buffer is tristateable; RTS = low enables the transmit buffer.

Note! RTS buffer is driven by CTS line and is always enabled (not tristated) !

Link Combination

Link	Position
M0	2 - 3
M1	1 - 2
M2	------
M3	------
TXE	2 - 3
RTM	1 - 2
CTM	------

7. Termination and Fail Save Resistors

7.1 Termination Resistors

To avoid signal reflections at the ends of RS422/485 lines, termination resistors have to be placed at both ends of the cable. These resistors (usually 120 ohms) can be directly mounted on the IO422/485 module at position R6 - R9 (SMD 1206).
The table below shows the coherence between resistors and signals.

Resistor	IO422/485 Standard	I/O485 2-Wire	IO422/485 Reverse
R6	CTS		RTS
R7	TxD	RxD / TxD	RxD
R8	RTS		CTS
R9	RxD		TxD

7.2 Fail Save Resistors

Fail save resistors, which also can be mounted on this module, define the signal level of the input lines (RxD and CTS) when there is no driver connected, or the output driver is tristate. One resistor is connected between Vcc and the positive input, and a second one between GND and the negative input. The value of these resistors is usually 330 ohms.
The resistor network R1 corresponds to RxD and CTS on standard modules, network R2 on reverse modules.

8. Description of Solder Links

Link	Function
M0 1 - 2	Selects the TxD buffer to DSUB pin 3 and 4
M0 2 - 3	Selects the TxD buffer to DSUB pin 1 and 2
M1 installed	Selects RxD input buffer connected to DSUB pin 3 and 4
M1 not installed	Selects RxD input buffer connected to DSUB pin 1 and 2
M2 installed	Selects buffer direction for RTS and CTS RTS = output to DSUB pin 6 and 7 CTS = output to DSUB pin 8 and 9
M2 not installed	Selects buffer direction for RTS and CTS RTS = output to DSUB pin 8 and 9 CTS = output to DSUB pin 6 and 7
M3 installed	Enables the TxD buffer output **Note! Never install M3 together with TXE !**
TXE 1 - 2	TxD buffer output is enabled by CTS = low **Note! Never install TXE together with M3!**
TXE 2 - 3	TxD buffer output is enabled by RTS = low **Note! Never install TXE together with M3!**
RTM 1 - 2	RTS buffer is connected to CTS signal
RTM 2 - 3	RTS buffer is connected to RTS signal
CTM 1 - 2	CTS buffer is connected to CTS signal
CTM 2 - 3	CTS buffer is connected to DCD signal

9. IO485 Module Pin Description

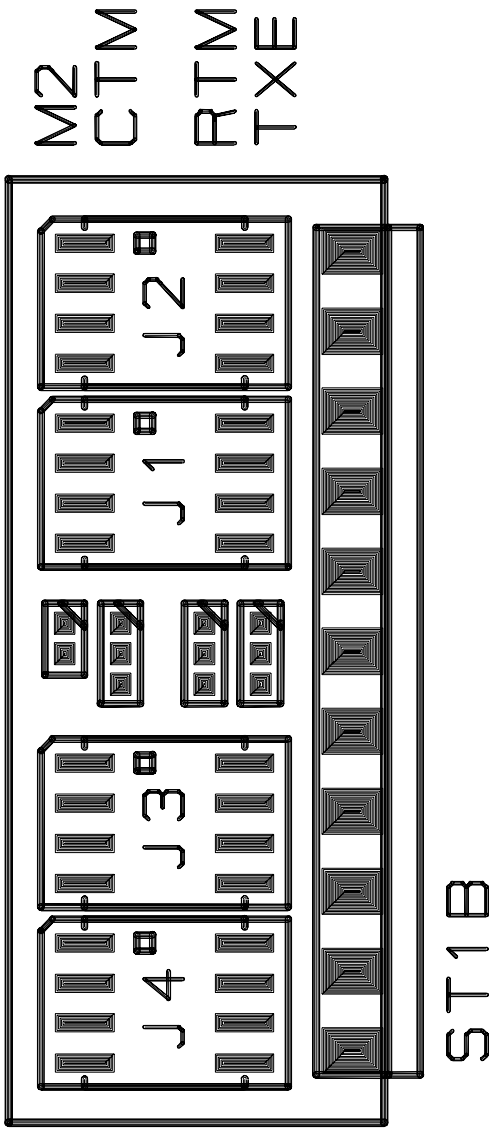
Pin	IO signal	Pin	TTL signal
1	NC	2	Vcc
3	GND	4	NC
5	CTS+	6	RI = Pull-up resistor
7	TxD+	8	NC
9	CTS-	10	CTS
11	TxD-	12	TxD
13	RTS-	14	RTS
15	RxD-	16	RxD
17	RTS+	18	DSR = Pull-up resistor
19	RxD+	20	DCD
21	NC	22	GND

Note! I/O signal names are shown for RS422 standard module.

10. Interconnection between DSUB Connector I/O Module

DSUB Pin	I/O Module Pin	RJ45 Pin
1	19	6
2	15	5
3	11	4
4	7	8
5	3	3
6	17	1
7	13	2
8	9	7
9	5	

11. Layout Component Side



12. Layout Solder Side