

Microsys

User's Manual

***miriac*[™] Modul Carrier**

CR854 Rev. 2

3rd edition

Declaration of Conformity

We, Manufacturer
MicroSys Electronics GmbH
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Germany

declare that the product

CR854

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

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Edition

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1. Introduction

1.1 Short Description

The **miriac**[™] Module Carrier CR854 is built to operate the **miriac**[™] Power Module series PM854.

It features three **10/100 Mbit twisted pair Ethernet interfaces** with the LXT971 NetPHY with MII-Interface. Alternatively, it can be factory-side equipped with one CE854 **Dual Gigabit Ethernet** piggyback instead of the two onboard 100 MBit Ethernet PHYs.

System control is handled via a hardware-reset **switch** and a **Power switch** that controls the ATX power supply.

The PM85X **miriac**[™] module is plugged onto the carrier via two 200-pin connectors and one 100-pin connector. (Note: The additional 100-pin connector is used on PM856 only.)

The CR854 offers the following user-accessible connectors:

Name	Layout	Purpose	See Details in Section
ATX	Standard ATX Power Supply Receptacle	Power Supply	5.1.1
DBG	2x8-pin Wrap header	JTAG/COP interface	5.2.3
IRQ	2x10-pin Wrap header	IRQ source (PCI-IRQ A-D) and destination lines (PM854 IRQ0#-IRQ11#)	5.9
LAN-1 LAN-2 LAN-3	RJ-45 receptacles	10/100 MBit Ethernet interfaces	5.6
LAN-1 enable/disable	1x2 Wrap header	LAN-1 enable/disable (required when GB Ethernet module shall be used)	5.3.1.2, 6
PCI	64-bit PCI slot	PCI Bus connector	5.2.1
PWR-1 PWR-2	2x10-pin Wrap headers (each)	Power supply/outlet for add-on modules	5.1.1
Rapid-I/O	2x22-pin Wrap header	Rapid I/O interface	5.8
RST	1x2 Wrap header	Reset	6
ST12	1x11 Wrap header	PCI REQ/GNT signals	5.2.1.3
ST20 ST21 ST21	2x32-pin Wrap headers (each)	Local Bus, Ethernet and various control signals	5.2.2
ST30 ST31	2x32-pin Wrap headers (each)	Processor I/O ports A – D	5.3.1
UART-1 UART-2	RJ-45 receptacles	Serial ports (RS-232 with RTS/CTS handshake)	5.7

1.2 Specifications

The power requirements for the CR854 board are shown in the following table.

Power Requirements:

Supply Voltage	CR854		
	CR854	Ext.-Mod.	PM854
+3.3V, +5%/-2.5%,	ca. 250 mA	X	5 A
+5V, +5%/-2.5%,	ca. 35 mA) ¹	X	
+12V, +5%/-2.5%,		X	
-12V, +5%/-2.5%,		X	

)¹ CE854 Gigabit module not mounted

Environmental Requirements:

Operating Temperature	0 ° C to +70 ° C
Relative Humidity	0 to 95 % (non-condensing)
Storage Temperature	-40 ° C to + 85 ° C

1.3 Related Documentation

The following manuals are applicable to the CR854:

- LXT971 User's Manual
- Marvell 88E1111 User's Manual

2. Delivery

2.1 Items shipped with this unit

- User's Manual CR854 Hardware
- MicroSys shipping carton



ATTENTION: STATIC DISCHARGE CAN DESTROY UNIT

2.2 Hints for unpacking, handling and storing

- Avoid touching areas of integrated circuitry.
- Unit should only be placed on a static-free conductive surface
- Unit must only be transported using anti-static bags or MicroSys shipping carton
- Packing should be saved if unit needs to be reshipped or returned
- When the unit needs to be stored, it should be placed in a moist free, dust free environment. The storage temperatures and humidity specifications are shown in chapter 1

3. Installation

3.1 Items required for CR854 installation

For installation of the CR854 (with the PM854), the following items are required.

- ATX compatible power supply



**Some ATX power supplies need a minimum load at +5V output.
The CR854 with mounted PM854 needs only 35 mA @ +5V. Please
check if an additional load is necessary!**

- *miriac*™ Module

3.2 Points to be observed

Before the unit is mounted onto the carrier, the following points should be observed.

- Unit requires at least +3.3V & 5V (+5 %, -2,5 %).
- mounted I/O-Modules or extension module may require +/-12, (+5 %, -2,5 %).
- Check default jumper setting.



The operating temperature must never exceed its specified range.

**GUARANTEE IS VOID IF UNIT IS OPERATED
OUT OF Its SPECIFICATIONS!**

4. Board Overview

4.1 Features CR854

Board Format:	185 mm x 200 mm
Ethernet:	3x LXT971 NetPhy 10/100Mbit twisted pair interface Status LEDs for: RX, LI, Speed
CE854 Module (optional):	2x Marvell 88E1111 Gigabit NetPhy 12 status LEDs
Serial I/O:	UART-1 - RS232 - RJ45 connector UART-2 - RS232 - RJ45 connector
Control:	power switch reset switch reset jumper Ethernet disable jumper
I²C Bus:	accessible via wrap connector
PCI / Local Bus Extension:	Standard 3.3V 64-bit PCI connector
Extension Module 1: (GPIO Module)	20 pin wrap connector to all power lines 2x 64 pin wrap connector to MPC8540 port lines, Ethernet-0 and serial ports
Extension Module 2: (PCI/Local Bus Module)	20 pin wrap connector to all power lines 3x 64 pin wrap connectors to MPC8540 Local bus/Ethernet/etc.
Rapid I/O:	44 pin wrap connector
IRQ:	MPC8540 and PCI IRQ lines accessible by 20 pin wrap connector
Debug Interface:	16 pin wrap connector with MPC8540 JTAG/COP interface

5. Functional Description

5.1 The Power Supply

5.1.1 The ATX Connector

The CR854 is supplied with all necessary voltages via the 20-pin ATX connector by an ATX compatible power supply. The CR854 and a mounted **miriac™ Power Module** use 5V and 3.3V. The +/-12V supply is only necessary for extension modules connected to the wrap connector PWR1 or PWR2.

The 20-pin wrap connectors PWR1 and PWR2 are connected directly to the 20-pin ATX connector with the same pin out, however the pins are counted in a different way.

PWR	ATX	Signal
Pin 1	Pin 1	+3.3V
Pin 3	Pin 2	+3.3V
Pin 5	Pin 3	GND
Pin 7	Pin 4	+5V
Pin 9	Pin 5	GND
Pin 11	Pin 6	+5V
Pin 13	Pin 7	GND
Pin 15	Pin 8	n.c.
Pin 17	Pin 9	n.c.
Pin 19	Pin 10	+12V

Signal	ATX	PWR
+3.3V	Pin 11	Pin 2
-12V	Pin 12	Pin 4
GND	Pin 13	Pin 6
Power On	Pin 14	Pin 8
GND	Pin 15	Pin 10
GND	Pin 16	Pin 12
GND	Pin 17	Pin 14
n.c.	Pin 18	Pin 16
+5V	Pin 19	Pin 18
+5V	Pin 20	Pin 20



Some ATX power supplies need a minimum load at +5V output. The CR854 with mounted PM854 needs only 35 mA @ +5V. Please check if an additional load is necessary!

5.2 The *miriac™* Module Slot

The CR854 is designed to operate the **miriac™ Power Module PM854**. The module fits into the two 200 pin SMD connectors ST1 and ST2 and the optional 100-pin connector ST3. ST1 contains the necessary 3.3V power supply lines, the Rapid I/O interface, the IRQ lines and the 64-bit PCI bus. ST2 carries the three Ethernet interfaces (MII / GMII), the Debug interface, the I²C and the local bus. The I/O port lines of the MPC8540 lead via the optional ST3 to two 64-pin wrap connectors for module extension purposes. **User designed** modules, directly connecting to any MPC85X0 device, **must never** exceed the specifications for 3.3V devices.



ATTENTION:
The MPC85X0 is NOT 5 Volt tolerant on any pin !

5.2.1 Pin Assignment - Connector ST1/ST9/ST10/ST11/ST12

ST1 carries the power supply, the **PCI bus**, the **Rapid I/O** interface and the **interrupt lines**.

ST1 Pin	ST9 Pin	ST10 Pin	ST11 Pin	Signal	Signal	ST11 Pin	ST10 Pin	ST9 Pin	ST1 Pin
1				ground	ground				2
3				VDD	VDD				4
5				VDD	VDD				6
7				VDD	VDD				8
9				VDD	VDD				10
11				ground	ground	20			12
13			1	IRQ0#	IRQ6#	13			14
15			3	IRQ1#	IRQ7#	15			16
17			5	IRQ2#	IRQ8#	17			18
19			7	IRQ3#	IRQ9#	12			20
21			9	IRQ4#	IRQ10#	14			22
23			11	IRQ5#	IRQ11#	16			24
25				n.c.	IOOUT#	18			26
27				n.c.	n.c.				28
29				ground	ground		2		30
31		1		RIO-RD1	RIO-RD0		4		32
33		3		RIO-RD1#	RIO-RD0#		6		34
35		5		RIO-RD3	RIO-RD2		8		36
37		7		RIO-RD3#	RIO-RD2#		10		38
39				ground	ground				40
41		9		RIO-RCK	RIO-RCK#		12		42
43				ground	ground				44
45		13		RIO-RD5	RIO-RD4		16		46
47		11		RIO-RD5#	RIO-RD4#		14		48
49		17		RIO-RD7	RIO-RD6		20		50
51		15		RIO-RD7#	RIO-RD6#		18		52
53				ground	ground				54
55		19		RIO-RFR#	RIO-RFR		22		56
57				ground	ground				58
59		21		RIO-TCKI#	RIO-TCKI		24		60
61				ground	ground				62
63		23		RIO-TFR#	RIO-TFR		26		64
65				ground	ground				66
67		25		RIO-TD7#	RIO-TD6		28		68
69		27		RIO-TD7	RIO-TD6#		30		70
71		31		RIO-TD5#	RIO-TD4#		34		72
73		29		RIO-TD5	RIO-TD4		32		74
75				ground	ground				76

pin assignment of the connector ST1/ST9/ST10/ST11 continued

pin assignment of the connector ST1/ST9/ST10/ST11 continued

ST1 Pin	ST9 Pin	ST10 Pin	ST11 Pin	Signal	Signal	ST11 Pin	ST10 Pin	ST9 Pin	ST1 Pin
77		33		RIO-TCK#	RIO-TCK		36		78
79				ground	ground				80
81		35		RIO-TD3#	RIO-TD2#		38		82
83		37		RIO-TD3	RIO-TD2		40		84
85		41		RIO-TD1	RIO-TD0#		44		86
87		39		RIO-TD1#	RIO-TD0		42		88
89		43		ground	ground				90
91				n.c.	n.c.				92
93			19	CCKO	PCICLK			b16	94
95				ground	ground			b15	96
97	a60			REQ64#	ACK64#			b60	98
99	b40			PERR#	PAR64			a67	100
101	a38			STOP#	SERR#			b42	102
103	(*1)			IDSEL	PAR			a43	104
105	b37			DVSL#	IRDY#			b35	106
107	a34			FRME#	TRDY#			a36	108
109	b57			ground	ground			a37	110
111	b53			AD7	AD39			b86	112
113	a54			AD6	AD38			a86	114
115	b55			AD5	AD37			b87	116
117	a55			AD4	AD36			a88	118
119	b56			AD3	AD35			b89	120
121	a57			AD2	AD34			a89	122
123	b58			AD1	AD33			b90	124
125	a58			AD0	AD32			a91	126
127	a52			CBE0#	CBE4#			b66	128
129	a44			AD15	AD47			b80	130
131	b45			AD14	AD46			a80	132
133	a46			AD13	AD45			b81	134
135	b47			AD12	AD44			a82	136
137	a47			AD11	AD43			b83	138
139	b48			AD10	AD42			a83	140
141	a49			AD9	AD41			b84	142
143	b52			AD8	AD40			a85	144
145	b44			CBE1#	CBE5#			a65	146
147	b46			ground	ground			a69	148
149	b27			AD23	AD55			b74	150
151	a28			AD22	AD54			a74	152
153	b29			AD21	AD53			b75	154
155	a29			AD20	AD52			a76	156
157	b30			AD19	AD51			b77	158

pin assignment of the connector ST1/ST9/ST10/ST11 continued

pin assignment of the connector ST1/ST9/ST10/ST11 continued

ST1 Pin	ST9 Pin	ST12 Pin	ST11 Pin	Signal	Signal	ST11 Pin	ST12 Pin	ST9 Pin	ST1 Pin
159	a31			AD18	AD50			a77	160
161	b32			AD17	AD49			b78	162
163	a32			AD16	AD48			a79	164
165	b33			CBE2#	CBE6#			b65	166
167	b20			AD31	AD63			b68	168
169	a20			AD30	AD62			a68	170
171	b21			AD29	AD61			b69	172
173	a22			AD28	AD60			a70	174
175	b23			AD27	AD59			b71	176
177	a23			AD26	AD58			a71	178
179	b24			AD25	AD57			b77	180
181	a25			AD24	AD56			a73	182
183	b26			CBE3#	CBE7#			a64	184
185	b28			ground	ground			a63	186
187		2		GNT4#	n.c.				188
189		1		REQ4#	n.c.				190
191		6		GNT2#	GNT3#		4		192
193		5		REQ2#	REQ3#		3		194
195	a17	9		GNT0#	GNT1#		8		196
197	b18	10		REQ0#	REQ1#		7		198
199	b73			ground	ground			a72	200
	a6		4	INTA#					
	b7		6	INTB#					
	a7		8	INTC#					
	b8		10	INTD#					

(*1) connected to AD12 via 220 Ohm resistor

5.2.1.1 Other Pins on Connector ST9 (PCI)

These pins on ST9 are tied to the following supply voltages:

+12 V : a2

-12 V : b1

+5 V : a5, a8, a61, a62, b5, b6, b61, b62

+3.3 V : a10, a14, a16, a21, a27, a33, a39, a45, a53, a59, b19, b25, b31, b36, b41, b43, b54, b59

ground: a18, a24, a30, a35, a37, a42, a48, a50, a51, a56, a63, a69, a72, a78, a81, a87, a90, a93, b3, b15, b17, b22, b28, b34, b38, b46, b49, b50, b51, b57, b64, b67, b73, b76, b82, b85, b91, b94

Line a15 – RST# - is connected to HRST#, from ST2 pin 6.

5.2.1.2 Installing PCI Card



Attention!

Only 3.3V compatible PCI boards can be used in this board's slot!

Reverse insertion of PCI adapter may destroy PCI card, CR854 and *miriac*TM Power Module. Always pay attention to the indicated direction on the board (PCI FRONT ->) !

Always switch off power supply when inserting or removing PCI adapter.

5.2.1.3 Pin Assignment - Connector ST12

ST12 carries all PCI Request/Grant pairs, also those, which are not available on the PCI slot.

ST12 Pin	Signal MPC8540
1	REQ4#
2	GNT4#
3	REQ3#
4	GNT3#
5	REQ2#
6	GNT2#
7	REQ1#
8	GNT1#
9	GNT0#
10	REQ0#
11	ground

5.2.2 Pin Assignment - Connector ST2/ST20/ST21/ST22

The lines of connector ST2 are directly connected to the three adjacent Wrap headers ST20, ST21 and ST22 according to the following table.

ST2 Pin	ST20 Pin	ST21 Pin	ST22 Pin	Signal	Signal	ST22 Pin	ST21 Pin	ST20 Pin	ST2 Pin
1	1	1	1	ground	ground	2	2	2	2
3	3			STDBY	KRST#			4	4
5	5			SRST#	HRST#			6	6
7	7			HRSO#	TRST#			8	8
9	9			TMS	TCK			10	10
11	11			TDO	TDI			12	12
13	13			CKSTO	CKSTI			14	14
15				n.c.	ASLEEP			16	16
17	15			SDA	TRGI			18	18
19	17			SCL	TRGO			20	20
21	19			THERM0	THERMI			22	22
23		3		CTS0	CTS1		4		24
25		5		RTS0	RTS1		6		26
27		7		TXD0	TXD1		8		28
29		9		RXD0	RXD1		10		30
31		11		ground	ground		12		32
33			3	EC0-COL	EC0-CRS	4			34
35			5	EC0-TD3	EC0-RD3	6			36
37			7	EC0-TD2	EC0-RD2	8			38
39			9	EC0-TD1	EC0-RD1	10			40
41			11	EC0-TD0	EC0-RD0	12			42
43			13	EC0-TXE	EC0-RDV	14			44
45			15	EC0-TXR	EC0-RXR	16			46
47			17	EC0-TXC	EC0-RXC	18			48
49			19	ground	ground	20			50
51		13		EC2-TD5	EC2-TD0		14		52
53		15		EC2-TD6	EC2-TD1		16		54
55		17		EC2-TD7	EC2-TD2		18		56
57		19		EC2-TXE	EC2-TD3		20		58
59		21		EC2-TXR	EC2-TD4		22		60
61		23		EC2-TXC	n.c.				62
63				n.c.	EC2-CRS		24		64
65		25		EC2-COL	ground				66
67				ground	EC2-RD5		26		68
69		27		EC2-RD0	EC2-RD6		28		70
71		29		EC2-RD1	EC2-RD7		30		72
73		31		EC2-RD2	EC2-RDV		32		74
75		33		EC2-RD3	EC2-RXR		34		76

ST2 Pin	ST20 Pin	ST21 Pin	ST22 Pin	Signal	Signal	ST22 Pin	ST21 Pin	ST20 Pin	ST2 Pin
77		35		EC2-RD4	EC2-RXC		36		78
79			19	ground	ground	20			80
81		38		EC2-GXC	EC1-GXC		40		82
83			19	ground	ground	20			84
85			21	EC1-TD5	EC1-TD0	22			86
87			23	EC1-TD6	EC1-TD1	24			88
89			25	EC1-TD7	EC1-TD2	26			90
91			27	EC1-TXE	EC1-TD3	28			92
93			29	EC1-TXR	EC1-TD4	30			94
95			31	EC1-TXC	ground				96
97				ground	EC1-CRS	32			98
99			33	EC1-COL	n.c.				100
101				n.c.	EC1-RD5	34			102
103			35	EC1-RD0	EC1-RD6	36			104
105			37	EC1-RD1	EC1-RD7	38			106
107			39	EC1-RD2	EC1-RDV	40			108
109			41	EC1-RD3	EC1-RXR	42			110
111			43	EC1-RD4	EC1-RXC	44			112
113				n.c.	ground	46			114
115			45	ground	EC-MDCK		39		116
117		42		EC-GTCK	EC-MDIO		41		118
119		45		ground	ground		46		120
121	37			LCLKE	LCLK0			38	122
123	39			LCLK1	LCLK2			40	124
125	41			ground	ground				126
127	21			LDP1	LDP0			24	128
129	23			LDP3	LDP2			26	130
131	25			DRQ0#	BA27			28	132
133	27			DAC0#	BA28			30	134
135	29			DON0#	BA29			32	136
137	31			DRQ1#	BA30			34	138
139	33			DAC1#	BA31			36	140
141	35			DON1#	LGPL0			42	142
143	43			CSWD#	LGPL1			44	144
145	45			LALE	LGPL2			46	146
147	47			LCS0#	LGPL3			48	148
149	49			LCS1#	LGPL4			50	150
151	51			LCS2#	LGPL5			52	152
153	53			LCS3#	LBCTL			54	154
155	55			LCS4#	LWE0#			56	156
157	57			LCS5#	LWE1#			58	158
159	59			LCS6#	LWE2#			60	160
161	61			LCS7#	LWE3#			62	162

pin assignment of connector ST2/ST20/ST21/ST22 continued

pin assignment of connector ST2/ST20/ST21/ST22 continued

ST2 Pin	ST20 Pin	ST21 Pin	ST22 Pin	Signal	Signal	ST22 Pin	ST21 Pin	ST20 Pin	ST2 Pin
163	63			ground	ground			64	164
165			47	LAD0	LAD16	48			166
167			49	LAD1	LAD17	50			168
169			51	LAD2	LAD18	52			170
171			53	LAD3	LAD19	54			172
173			55	LAD4	LAD20	56			174
175			57	LAD5	LAD21	58			176
177			59	LAD6	LAD22	60			178
179			61	LAD7	LAD23	62			180
181			63	ground	ground	64			182
183		47		LAD8	LAD24		48		184
185		49		LAD9	LAD25		50		186
187		51		LAD10	LAD26		52		188
189		53		LAD11	LAD27		54		190
191		55		LAD12	LAD28		56		192
193		57		LAD13	LAD29		58		194
195		59		LAD14	LAD30		60		196
197		61		LAD15	LAD31		62		198
199		63		ground	ground		64		200

5.2.3 Pin Assignment - Connector DBG (JTAG/COP)

The Debug port is separately available on the **JTAG/COP connector DBG**. The connections are shown in the following table.

DBG Pin	ST2 Pin	Signal	Signal	ST2 Pin	DBG Pin
1	11	TDO	ground	1	2
3	12	TDI	TRST#	8	4
5		pull-up to VDD	pull-up to VDD		6
7	10	TCK	CKSTI	14	8
9	9	TMS	n.c.		10
11	5	SRST#	ground		12
13	6	HRST#	n.c.		14
15	13	CKSTO	ground		16

5.3 The GPIO Add-On Module Connectors

The CR854 features two 64-pin wrap connectors that carry all I/O lines from ST3 for connecting additional peripheral circuitry or line drivers.

5.3.1 Pin Assignment of Connectors ST3/ST30/ST31

The following table shows the relationship between *miriac*TM Power Module connector ST3 and Add-On module connectors ST30 / ST31.

ST3 Pin	ST31 Pin	Signal MPC8540	Signal MPC8540	ST30 Pin	ST3 Pin
1	1	ground	PC0	63	2
3	63	PA0	PC1	62	4
5	62	PA1	PC2	61	6
7	61	PA2	PC3	60	8
9	60	PA3	PC4	59	10
11	59	PA4	PC5	58	12
13	58	PA5	PC6	57	14
15	57	PA6	PC7	56	16
17	56	PA7	PC8	55	18
19	55	PA8	PC9	54	20
21	54	PA9	PC10	53	22
23	53	PA10	PC11	52	24
25	52	PA11	PC12	51	26
27	51	PA12	PC14	49	28
29	50	PA13	PC16	47	30
31	49	PA14	PC19	44	32
33	48	PA15	PC20	43	34
35	47	PA16	PC21	42	36
37	46	PA17	PC22	41	38
39	45	PA18	PC23	40	40
41	44	PA19	PC24	39	42
43	43	PA20	PC25	38	44
45	42	PA21	PC26	37	46
47	41	PA22	PC27	36	48
49	40	PA23	PC28	35	50
51	39	PA24	PC29	34	52
53	38	PA25	PC30	33	54
55	37	PA26	PC31	32	56
57	36	PA27	ground	31	58
59	35	PA28	PD4	29	60
61	34	PA29	PD5	28	62
63	33	PA30	PD6	27	64
65	32	PA31	PD7	26	66

Pin Assignment of Connectors ST3/ST30/ST31 continued

ST3 Pin	ST30 Pin	ST31 Pin	Signal MPC8540	Signal MPC8540	ST30 Pin	ST3 Pin
67		31	ground	PD8	25	68
69		15	PB18	PD9	24	70
71		14	PB19	PD10	23	72
73		13	PB20	PD11	22	74
75		12	PB21	PD12	21	76
77		11	PB22	PD13	20	78
79		10	PB23	PD14	19	80
81		9	PB24	PD15	18	82
83		8	PB25	PD16	17	84
85		7	PB26	PD17	16	86
87		6	PB27	PD18	15	88
89		5	PB28	PD19	14	90
91		4	PB29	PD20	13	92
93		3	PB30	PD21	12	94
95		2	PB31	PD22	11	96
97	8		PD25	PD23	10	98
99	9		PD24	ground	30	100

5.3.1.1 Other Pins on Connector ST30

In addition to the lines from ST3, the connector ST30 carries the serial UART ports from the MPC8540 (via ST2), and two lines of the Ethernet interface (LAN-1, Ethernet controller 0).

Please see section 5.3.1.2 about connection of the Ethernet lines!

Signal MPC8540	ST30 Pin	ST2 Pin
CTS0	48	23
CTS1	50	24
RTS0	4	25
RTS1	7	26
TXD0	3	27
TXD1	6	28
RXD0	2	29
RXD1	5	30
EC0-TXC	45	47*
EC0-RXC	46	48*

* Signal is provided via QuickSwitch – see text under section 5.3.1.2 !

5.3.1.2 Other Pins on Connector ST31 – Ethernet-0

In addition to the lines from ST3, the connector ST31 carries the Ethernet controller 0 (LAN-1) MII lines from ST2 fed through Quick Switches. Thus it is possible to select between the on-board NetPHY for LAN-1 and another off-board circuit on module position 1 (ST30/ST31/PWR1) by a single jumper, EC0. The respective unused port is cut off from the MII signals accordingly. For simplicity, the signals in the following table are labeled as if there was no QuickSwitch in between. Please keep this in mind when connecting any circuitry!

Signal	ST31 Pin	(ST2 Pin)*
EC0-COL	20	33
EC0-CRS	21	34
EC0-TD3	29	35
EC0-RD3	22	36
EC0-TD2	28	37
EC0-RD2	23	38
EC0-TD1	27	39
EC0-RD1	24	40
EC0-TD0	26	41
EC0-RD0	25	42
EC0-TXE	19	43
EC0-RDV	16	44
EC0-TXR	18	45
EC0-RXR	17	46
EC0-TXC	(ST30 pin 45)	47
EC0-RXC	(ST30 pin 46)	48

* corresponding pin on ST2 through QuickSwitch

5.4 The Power On Switch

The switch SW1 controls the power on line of the ATX power supply connector. It does not disconnect any supply line, i.e. the **power-on** function is only supported by an ATX compatible power supply. The power on switch connects pin 14 to GND.

ATX	Signal		Signal	ATX
Pin 1	+3.3V		+3.3V	Pin 11
Pin 2	+3.3V		-12V	Pin 12
Pin 3	GND		GND	Pin 13
Pin 4	+5V		Power On	Pin 14
Pin 5	GND		GND	Pin 15
Pin 6	+5V		GND	Pin 16
Pin 7	GND		GND	Pin 17
Pin 8	n.c.		n.c.	Pin 18
Pin 9	n.c.		+5V	Pin 19
Pin 10	+12V		+5V	Pin 20

5.5 The Reset Switch

The switch SW2 is connected to pin 2 of connector ST2 and activates the reset line of the **miriac**TM module.

5.6 The Ethernet Interface

The CR854 comes in two varieties:

5.6.1 CR854 with 3x 10/100Base-T NetPHYs on board

This variant contains three **10/100Base-T** Ethernet interfaces onboard the CR854, controlled by LXT971 NetPHYs. The **MII-Interfaces** of the NetPHYs are connected to the MII/GMII-Interfaces EC0-EC2 of the MPC8540 according to the table in 5.6.4. All NetPHYs work in MII-4-bit-mode. All three configuration pins of the NetPHYs are tied to VDD, i.e. auto-negotiation with 10/100M and Full/Half duplex is enabled.

The NetPHYs are permanently enabled by solder bridges on the EC0 jumper and an open link on the ECX-EN line (= HIGH signal by pull-up).

5.6.2 CR854 with CE854 Gigabit piggyback

With this variant, two Gigabit Ethernet PHYs are connected to the GMII/TSEC interfaces of the MPC8540. The Gigabit Ethernet PHYs reside on the CE854 piggyback module (to be plugged on to module space 2 (ST20/ST21/ST22/ PWR2)) while the corresponding two PHY positions on the CR854 are empty. The remaining 10/100Base-T NetPHY on the CR854 is not affected.

5.6.3 NetPHY ordering table

The following table shows the MDIO addressing sequence of the NetPHYs:

	3x 10/100Base-T	2x 10/100/1000Base-T 1x 10/100Base-T
NetPHY1	J1 on CR854 MDIO address 0	J1 on CE854 piggyback – GMII/TSEC1 MDIO address 0
NetPHY2	J2 on CR854 MDIO address 1	J2 on CE854 piggyback – GMII/TSEC2 MDIO address 1
NetPHY3	J3 on CR854 MDIO address 3	J3 on CR854 MDIO address 3

5.6.4 Network signal/pin assignments

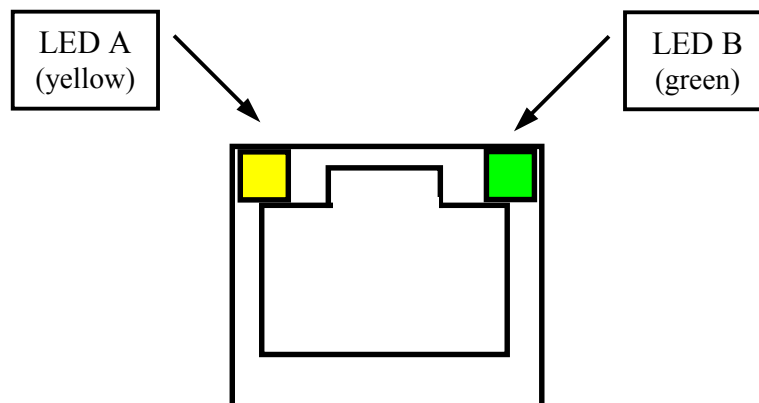
NetPhy Signal	MPC8540 Signal EC0-/EC1-/EC2-...	Pin on ST2 for EC0	Pin on ST2 for EC1	Pin on ST2 for EC2	Description
RX_ER	RXR	46	110	76	receive error
RX_DV	RDV	44	108	74	receive data valid
COL	COL	33	99	65	collision
CRS	CRS	34	98	64	carrier sense
RX_CLK	RXC	48	112	78	receive clock
RXD0	RD0	42	103	69	receive data 0
RXD1	RD1	40	105	71	receive data 1
RXD2	RD2	38	107	73	receive data 2
RXD3	RD3	36	109	75	receive data 3
TX_EN	TXE	43	91	57	transmit enable
TX_ER	TXR	45	93	59	transmit error
TX_CLK	TXC	47	95	61	transmit clock
TXD0	TD0	41	86	52	transmit data 0
TXD1	TD1	39	88	54	transmit data 1
TXD2	TD2	37	90	56	transmit data 2
TXD3	TD3	35	92	58	transmit data 3
MDIO	EC-MDIO	118			management data I/O
MDC	EC-MDCK	116			management data clk
ECX-EN	ECX-EN	ST22 Pin 2			LAN-2 / LAN-3 enable/disable

Note: For Gigabit Ethernet applications, the complete 8-bit wide (G)MII interfaces are available on the connectors ST21 and ST22.

5.6.5 The RJ45 Connectors ST4/ST5/ST6 Pin out

Pin	Signal	Description
1	TxD+	10/100Mbps TP+ transmit line
2	TxD-	10/100Mbps TP- transmit line
3	RxD+	10/100Mbps TP+ receive line
4	center	75R terminated
5	center	75R terminated
6	RxD-	10/100Mbps TP- receive line
7	center	75R terminated
8	center	75R terminated

5.6.6 The Ethernet Status LEDs – CR854, 100MBit onboard

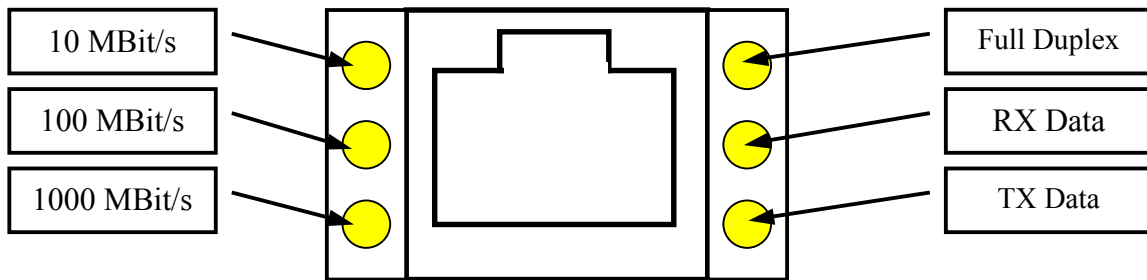


The functionality of the Ethernet LEDs A and B is programmable in the LXT971.

LED A is connected to the LED/CFG1, LED B to LED/CFG3 of the LXT971.

By default, LED A shows speed status and is switched on with 100Mbit connection while LED B displays receive status.

5.6.7 The Ethernet Status LEDs – CE854, Gigabit Ethernet



5.7 The Serial Ports

Both serial ports of the MPC8540 are available on RJ45 connectors via one MAX3232 serial port driver each.

5.7.1 UART-1 Port RJ45 Connector ST7

This I/O port is a 5-wire RS-232C interface (RTS/CTS handshake).

RJ45 Pin	RS232 Signal	Description	corresponding ST2 pin
1	n.c.		
2	RTS	MPC8540-RTS0	25
3	GND	board GND	
4	TXD	MPC8540-TXD0	27
5	RXD	MPC8540-RXD0	29
6	n.c.		
7	CTS	MPC8540-CTS0	23
8	n.c.		

5.7.2 UART-2 Port RJ45 Connector ST8

This I/O port is a 5-wire RS-232C interface (RTS/CTS handshake).

RJ45 Pin	RS232 Signal	Description	corresponding ST2 pin
1	n.c.		
2	RTS	MPC8540-RTS1	26
3	GND	board GND	
4	TXD	MPC8540-TXD1	28
5	RXD	MPC8540-RXD1	30
6	n.c.		
7	CTS	MPC8540-CTS1	24
8	n.c.		

5.8 Rapid I/O connector pin out

On ST10, the CR854 offers a Rapid I/O interface, with the following pin out.

ST10 Pin	ST1 Pin	Signal	Signal	ST1 Pin	ST10 Pin
1	31	RIO-RD1	ground	30	2
3	33	RIO-RD1#	RIO-RD0	32	4
5	35	RIO-RD3	RIO-RD0#	34	6
7	37	RIO-RD3#	RIO-RD2	36	8
9	41	RIO-RCK	RIO-RD2#	38	10
11	47	RIO-RD5#	RIO-RCK#	42	12
13	45	RIO-RD5	RIO-RD4#	48	14
15	51	RIO-RD7#	RIO-RD4	46	16
17	49	RIO-RD7	RIO-RD6#	52	18
19	55	RIO-RFR#	RIO-RD6	50	20
21	59	RIO-TCKI#	RIO-RFR	56	22
23	63	RIO-TFR#	RIO-TCKI	60	24
25	67	RIO-TD7#	RIO-TFR	64	26
27	69	RIO-TD7	RIO-TD6	68	28
29	73	RIO-TD5	RIO-TD6#	70	30
31	71	RIO-TD5#	RIO-TD4	74	32
33	77	RIO-TCK#	RIO-TD4#	72	34
35	81	RIO-TD3#	RIO-TCK	78	36
37	83	RIO-TD3	RIO-TD2#	82	38
39	87	RIO-TD1#	RIO-TD2	84	40
41	85	RIO-TD1	RIO-TD0	88	42
43	89	ground	RIO-TD0#	86	44

5.9 The CR854 Interrupt Structure

There are twelve low active interrupt lines onboard the PM854. None of the interrupt levels are used per default onboard the CR854, so all interrupts are free for any user-implemented application. All interrupt lines are available on the 2x10-pin wrap header ST11, and can be connected via jumpers to one of the PCI interrupt lines which are also on ST11, or used by cabling for other purposes.

ST11 Pin	Signal	Signal	ST11 Pin
1	IRQ0#	n.c.	2
3	IRQ1#	INTA#	4
5	IRQ2#	INTB#	6
7	IRQ3#	INTC#	8
9	IRQ4#	INTD#	10
11	IRQ5#	IRQ9#	12
13	IRQ6#	IRQ10#	14
15	IRQ7#	IRQ11#	16
17	IRQ8#	IOUT#	18
19	CCKO	ground	20

5.10 The I²C Bus

The I²C bus onboard the PM854 is controlled via the SDA and SCL pins of the MPC8540 and drives a real-time clock and an EEPROM onboard the PM854. For extension purposes, this I²C bus is accessible via the wrap connector ST20.

ST20	Signal
Pin 15	SDA
Pin 17	SCL

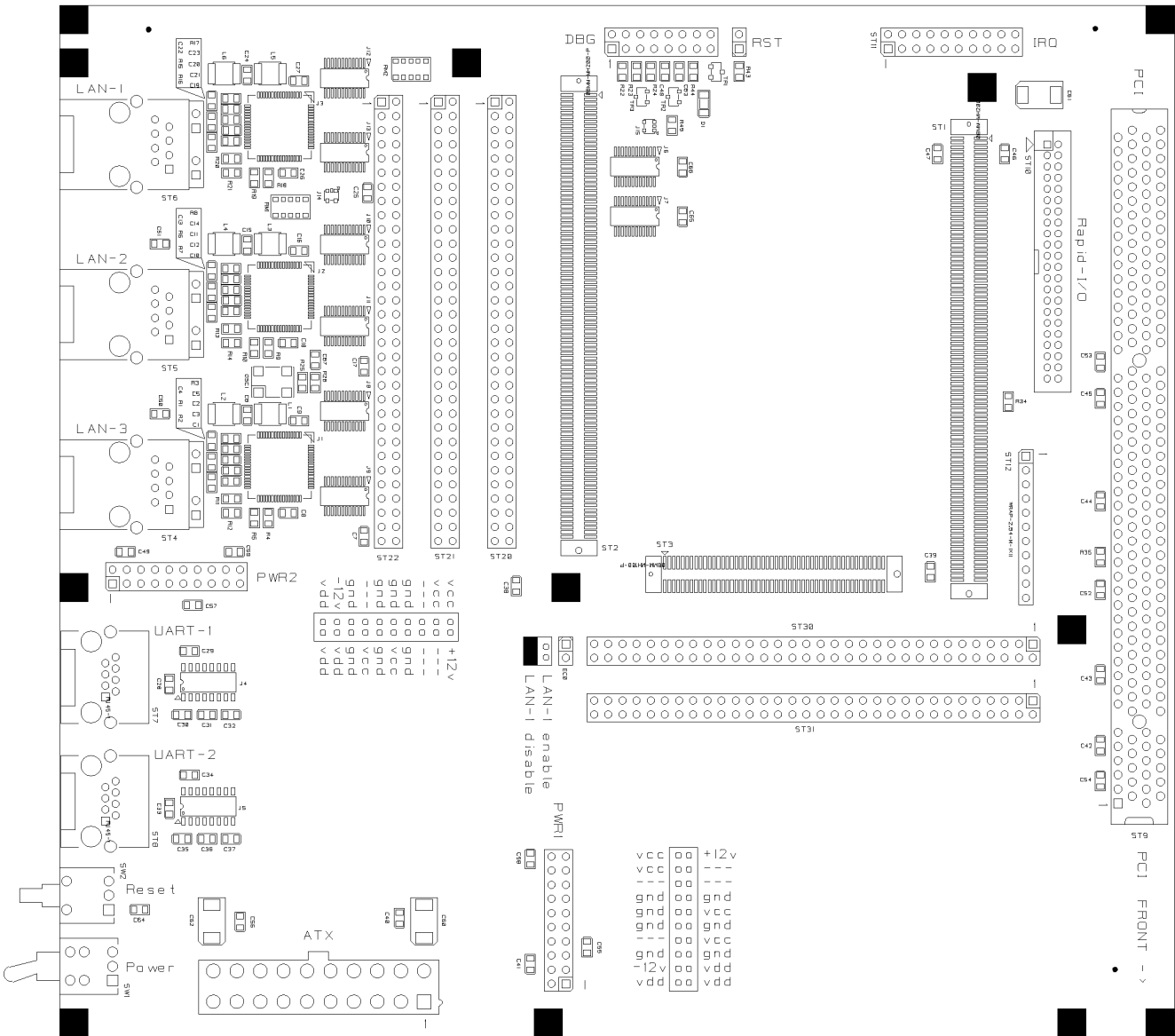
6. Summary of CR854 Jumpers

Described function is valid, when jumper is set or link is intact !

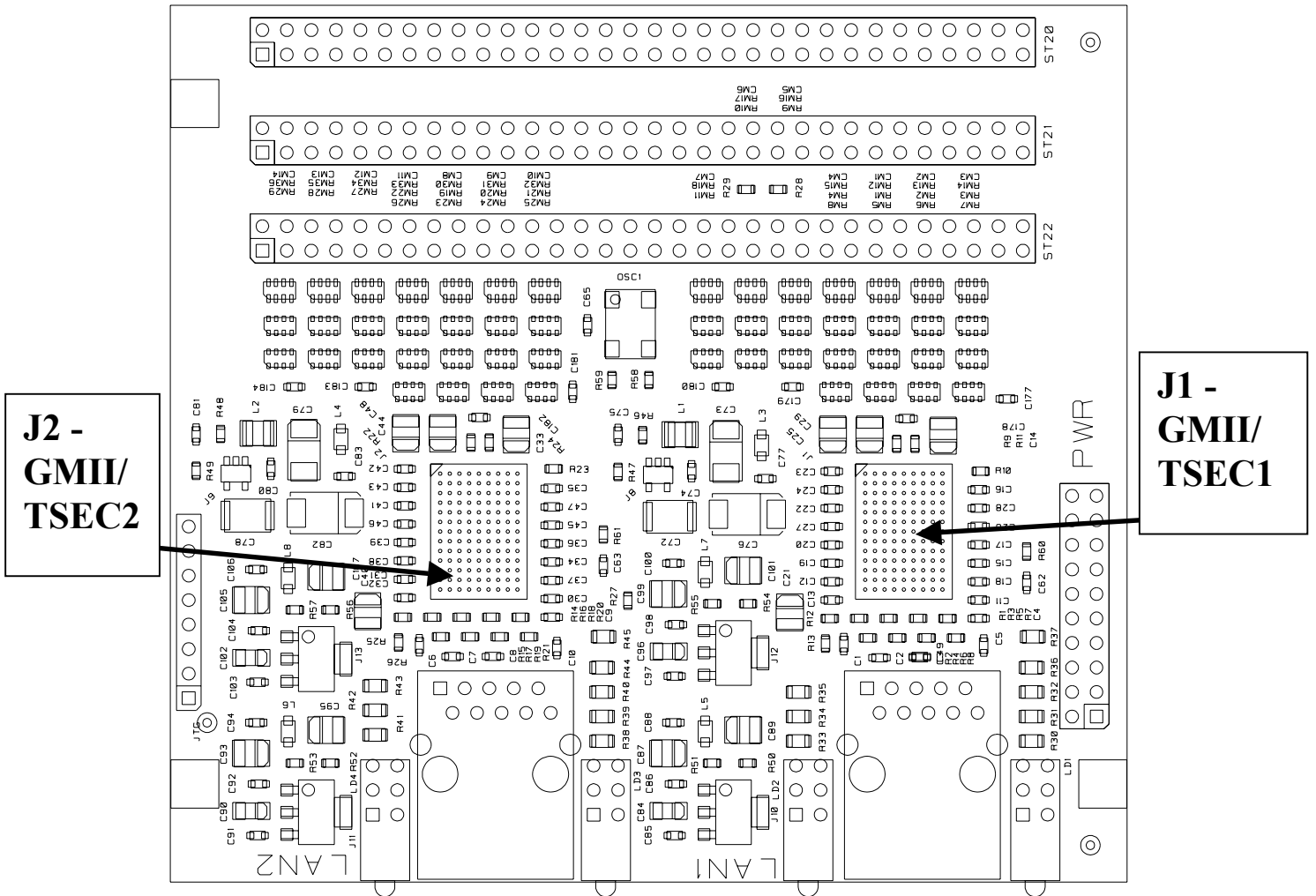
Size:	Name:	Default:	Position:	Function:
1x2	EC0		1-2	On-board NetPHYs disabled
		#	---	On-board NetPHYs enabled
1x2	RST		1-2	CPU held in reset
		#	---	CPU not held in reset

Appendices

Appendix A: Layout Component Side - CR854



Appendix B: Layout Component Side – CE854



Appendix C: Schematics CR854 + CE854 (contact *MicroSys*)