

Microsys

User's Manual

***miriac*[™] Modul Carrier**

CR826 Rev. 2

3rd edition

Declaration of Conformity

We, Manufacturer
MicroSys Electronics GmbH
Mühlweg 1
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Germany

declare that the product

CR826

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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Table of Contents

1.	Introduction	7
1.1	Short Description	7
1.2	Specifications	8
1.3	Related Documentation	8
2.	Delivery	9
2.1	Items shipped with this unit	9
2.2	Hints for unpacking, handling and storing	9
3.	Installation	10
3.1	Items required for CR826 installation	10
3.2	Points to be observed	10
4.	Board Overview	11
4.1	Features CR826	11
5.	Functional Description	12
5.1	The PM82X Module Slot	12
5.2	The JTAG/COP interface	12
5.3	The Power On Switch	13
5.4	The Reset Switch	13
5.5	The Abort Switch	13
5.6	The Ethernet Interface	14
5.6.1	The RJ45 Connector Pin out	15
5.6.2	The Ethernet Status LED Block	15
5.7	SMC2 Port RJ45 Connector ST6	16
5.8	SCC1 Port RJ45 Connector ST7-D	16
5.9	SCC2 Port RJ45 Connector ST7-C	17
5.10	SCC3 Port RJ45 Connector ST7-B	17
5.11	SCC4 Port RJ45 Connector ST7-A	18
5.12	The User LEDs 1-8	19
5.13	The 8 Bit Dipswitch	19
5.14	The CR826 Interrupt Structure	20
5.15	The ATX and PWR Power Supply Connectors	20
5.16	The Backup Feature	21
5.17	The I ² C Bus	21
5.18	The SPI Bus	21
5.19	The <i>miriac</i> TM Module Connectors	22
5.19.1	Pin Assignment of the Connector ST1	22
5.19.2	Pin Assignment of the Connector ST2	24
5.20	The Add-On Module Connectors	26
5.20.1	Pin Assignment of the Connector ST3	26
5.20.2	Pin Assignment of the Connector ST4	27
5.21	Pin Assignment of the PCI Connector ST5	28
5.22	Additional test connector	30
5.22.1	Pin Assignment of the Connector ST12	30
5.23	The ISDN/S0 Interface	31
5.23.1	Pin assignment of the RJ45 connector ST8	31
5.24	The ISDN/E1 Interface	32
5.24.1	Pin assignment of the RJ45 connector ST11	33

5.25	The ATM Interface	34
5.25.1	Pin assignment of the RJ45 connector ST9	35
6.	Summary of Jumpers	36
6.1	Summary of PCI Configuration Resistors.....	38
	Appendices.....	40
	Appendix A: Layout Component Side.....	41
	Appendix B: Physical Dimensions of Extension Module.....	42
	Appendix C: Schematics CR826 (in printed Manuals only).....	43

1. Introduction

1.1 Short Description

The *miriac*[™] Module Carrier CR826 is built to operate the *miriac*[™] Power Module series (e.g. PM825 or PM826).

It features a **10/100Mbit twisted pair ethernet interface** controlled by the LXT971 NetPhy with MII-Interface. Four module slots for IO-Modules offer various EIA standards for all SCC communication ports of the MPC82XX. The SMC2 port of the MPC82XX uses a fixed RS232 interface.

Optionally, the CR826 can be fitted out with interfaces for opto isolated or twisted pair **ATM-155** and two **ISDN** communication standards.

System control is handled via a power-on switch suitable for ATX compatible power supplies, a hardware **reset switch** and an interrupt generating **abort switch**.

User applications are supported by **8 user programmable LEDs** as well as by a software readable **8 bit dip switch**.

For background debug purposes the **JTAG/COP** interface of the MPC82XX is accessible via a 16 pin standard wrap connector.

The complete **local bus** as well as all **120 I/O lines** of the *miriac*[™] Power Module are accessible by the carrier board through two 140 pin connectors.

The board is implemented in **CMOS technology**, which allows for a power consumption as low as **4,5W** including a mounted PM826 module with 166 MHz CPU speed.

1.2 Specifications

The power requirements for the CR826 board are shown in the following table.

Power Requirements:

Supply Voltage	CR826			
	CR826 ¹	Ext.-Mod.	I/O-Mod.	PM826
+3.3V, +5%/-2.5%,	20 mA	X		1 A
+5V, +5%/-2.5%,	250 mA	X	X	
+12V, +5%/-2.5%,		X	X	
-12V, +5%/-2.5%,		X	X	

Note 1: Values shown are for CR826 version 1 without ATM and ISDN interfaces.

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 CR826:

- LXT971 User's Manual
- MC145574 Data Sheet
- PM5350 ATM Interface
- DS21354 Data Sheet

2. Delivery

2.1 Items shipped with this unit

- User's Manual CR826 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 moistfree, dustfree environment. The storage temperatures and humidity specifications are shown in chapter 1

3. Installation

3.1 Items required for CR826 installation

For installation of the CR826, the following items are required.

- ATX compatible power supply



Note! Some ATX power supplies need a minimum load at +5V output. The CR826 with mounted PM82X needs only 250 mA @ +5V. Please check if an additional load is necessary!

- PM82X Power 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 it's specified range.

**GUARANTEE IS VOID IF UNIT IS OPERATED
OUT OF IT'S SPECIFICATIONS!**

4. Board Overview

4.1 Features CR826

Board Format:	160mm x 233mm
Ethernet:	LXT971 NetPhy 10/100Mbit twisted pair interface status LEDs for: RX, LI, Speed
Serial I/O:	SMC2 - RS232 - RJ45 connector SCC1 - module - RJ45 connector SCC2 - module - RJ45 connector SCC3- module - RJ45 connector SCC4- module - RJ45 connector
Status:	8 user programmable LEDs 3 Ethernet status LEDs 3.3V power indicator LED 5V power indicator LED
Control:	power switch reset switch abort switch 8 bit dip switch
I²C Bus:	accessible via wrap connector
SPI Interface:	accessible via wrap connector
PCI / Local Bus Extension:	Standard 124 pin PCI connector (functionality depends on mounted PM82X module)
Extension Module:	20 pin wrap connector with all power lines 64 pin wrap connector with MPC82XX port A/B lines 64 pin wrap connector with MPC82XX port C/D lines
Debug Interface:	16 pin wrap connector with MPC82XX JTAG/COP interface
Data backup:	long time backup for <i>miriac</i> TM Power Module via lithium cell
ATM155:	optional (available only on version 2 boards) PM5350 controller twisted pair interface opto isolated interface
S0-Interface:	optional (available only on version 2 boards) MC145574 controller RJ45 connector
E1-Interface:	optional (available only on version 2 boards) DS21354 controller RJ45 connector

5. Functional Description

5.1 The PM82X Module Slot

The CR826 is used to operate the *miriac*[™] **Power Module PM82X**. The module fits into the two 140 pin SMD connectors ST1 and ST2. ST1 contains the necessary 3.3V power supply line and all local bus / PCI and some control lines of the MPC82XX. The 120 I/O lines of the MPC82XX lead via ST2 to two 64 pin wrap connectors for module extension purposes as well as to the onboard I/O modules and I/O devices. All signals leading from onboard devices to the PM82X module are shifted to 3.3V TTL level. **User designed** modules, direct connecting to any MPC82XX line, **MUST** never exceed the specifications for 3.3V devices.



ATTENTION: The MPC82XX is NOT 5 volt tolerant on any pin !

5.2 The JTAG/COP interface

The **JTAG/COP** interface of the PM82X can only be used via the carrier board. The 16 pin wrap connector DBG contains the necessary lines according to the following table.

DBG	Signal		Signal	DBG
Pin 1	TDO		GND	Pin 2
Pin 3	TDI		TRST#	Pin 4
Pin 5	QREQ#		2K2 pullup	Pin 6
Pin 7	TCK		n.c.	Pin 8
Pin 9	TMS		n.c.	Pin 10
Pin 11	SRST#		GND	Pin 12
Pin 13	HRST#		n.c.	Pin 14
Pin 15	CKSTPO#		GND	Pin 16

5.3 The Power On Switch

The switch SW4 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 ground.

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

5.4 The Reset Switch

The switch SW2 is connected to the board supervisory circuit MAX-793 of the PM82X and activates the board reset line.

5.5 The Abort Switch

The switch SW3 is debounced via an RS-flipflop, which connects to the interrupt line IRQ1# of the MPC82XX.

5.6 The Ethernet Interface

The CR826 contains a **10/100Base-T** Ethernet interface controlled by the LXT971 NetPHY. The **MII-Interface** of the NetPHY is connected to **FCC1-MII** of the MPC82XX according to following table. The NetPHY works in MII-4-bit-mode. All OPMODE configuration pins of the NetPHY are tied to ground, i.e. auto-negotiation is enabled with all capabilities with flow control, and its physical address inputs are set to **\$01**.

NetPhy signal:	connected to:	description:
RXEN	Vcc	receive enable
RXER	MPC82XX-Port A26	receive error
RXDV	MPC82XX-Port A27	receive data valid
COL	MPC82XX-Port A31	collision
CRS	MPC82XX-Port A30	carrier sense
RXCK	MPC82XX-Port C21	receive clock
RXD0	MPC82XX-Port A17	receive data 0
RXD1	MPC82XX-Port A16	receive data 1
RXD2	MPC82XX-Port A15	receive data 2
RXD3	MPC82XX-Port A14	receive data 3
TXEN	MPC82XX-Port A28	transmit enable
TXER	MPC82XX-Port A29	transmit error
TXCK	MPC82XX-Port C22	transmit clock
TXD0	MPC82XX-Port A18	transmit data 0
TXD1	MPC82XX-Port A19	transmit data 1
TXD2	MPC82XX-Port A20	transmit data 2
TXD3	MPC82XX-Port A21	transmit data 3
MDIO	MPC82XX-Port C24	management data I/O
MDC	MPC82XX-Port C23	management data clock

5.6.1 The RJ45 Connector 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

5.6.2 The Ethernet Status LED Block

Led Block LD11:

yellow	Receive
yellow	Link Integrity
yellow	100MBit

5.7 SMC2 Port RJ45 Connector ST6

This I/O port is a RS-232C 3-wire interface (no handshakes).

Pin:	RS232 Signal:	Module Pin:	Description:	MPC82XX Port:
1	n.c.	---	not used	
2	n.c.	---	not used	
3	GND	3	board ground	
4	TxD	103	MPC82XX-SMC2-TXD	Port C15
5	RXD	63	MPC82XX-SMC2-RXD	Port D4
6	n.c.	---	not used	
7	n.c.	---	not used	
8	n.c.	---	not used	

5.8 SCC1 Port RJ45 Connector ST7-D

The I/O port can be configured by an **I/O-Module**, which fits into socket **MOD1**.

Pin:	RS232 Signal:	Module Pin:	Description:	MPC82XX Port:
1	DSR	17	not used	
2	RTS	13	MPC82XX-SCC1-RTS	Port D29
3	GND	3	board ground	
4	TXD	11	MPC82XX-SCC1-TXD	Port B28
5	RXD	15	MPC82XX-SCC1-RXD	Port D31
6	DCD	19	MPC82XX-SCC1-DCD	Port C14
7	CTS	9	MPC82XX-SCC1-CTS	Port C29
8	DTR	7	not used	

5.9 SCC2 Port RJ45 Connector ST7-C

The I/O port can be configured by an **I/O-Module**, which fits into socket **MOD2**.

Pin:	RS232 Signal:	Module Pin:	Description:	MPC82XX Port:
1	DSR	17	not used	
2	RTS	13	MPC82XX-SCC2-RTS	Port D26
3	GND	3	board ground	
4	TXD	11	MPC82XX-SCC2-TXD	Port D27
5	RXD	15	MPC82XX-SCC2-RXD	Port B15
6	DCD	19	MPC82XX-SCC2-DCD	Port C12
7	CTS	9	MPC82XX-SCC2-CTS	Port C28
8	DTR	7	not used	

5.10 SCC3 Port RJ45 Connector ST7-B

The I/O port can be configured by an **I/O-Module**, which fits into socket **MOD3**.

Pin:	RS232 Signal:	Module Pin:	Description:	MPC82XX Port:
1	DSR	17	not used	
2	RTS	13	MPC82XX-SCC3-RTS	Port D23
3	GND	3	board ground	
4	TXD	11	MPC82XX-SCC3-TXD	Port B8
5	RXD	15	MPC82XX-SCC3-RXD	Port B14
6	DCD	19	MPC82XX-SCC3-DCD	Port C10
7	CTS	9	MPC82XX-SCC3-CTS	Port C11
8	DTR	7	not used	

5.11 SCC4 Port RJ45 Connector ST7-A

The I/O port can be configured by an **I/O-Module**, which fits into socket **MOD4**.

Pin:	RS232 Signal:	Module Pin:	Description:	MPC82XX Port:
1	DSR	17	not used	
2	RTS	13	MPC82XX-SCC4-RTS	Port D20
3	GND	3	board ground	
4	TXD	11	MPC82XX-SCC4-TXD	Port D21
5	RXD	15	MPC82XX-SCC4-RXD	Port D22
6	DCD	19	MPC82XX-SCC4-DCD	Port C8
7	CTS	9	MPC82XX-SCC4-CTS	Port C9
8	DTR	7	not used	

5.12 The User LEDs 1-8

The CR826 contains eight user programmable LEDs. The LED is switched on, if the according port pin of the MPC82XX is programmed as totem pole output and set to low.

Led:	MPC82XX Port:
1	Port A10
2	Port A11
3	Port A12
4	Port A13
5	Port C2
6	Port C3
7	Port D24
8	Port D25

5.13 The 8 Bit Dipswitch

The CR826 offers an eight bit dipswitch for user applications. The switch driver is connected to the described port pins, if jumper AA is installed. Otherwise the switch has no function, but the necessary port pins of the MPC82XX can be used for other purposes. A switch line can be read low if the jumper AA is installed, the switch is closed and the MPC82XX port is configured as input. If jumper AA is installed, **all 8 port lines MUST be configured as input.**

Switch:	MPC82XX Port:
1	Port A22
2	Port A23
3	Port A24
4	Port A25
5	Port C6
6	Port C7
7	Port D6
8	Port D7

5.14 The CR826 Interrupt Structure

There are eight low active interrupt lines onboard the PM82X. The interrupt levels are used onboard the CR826 according to following table.

Level	MPC82XX	External Source
0	IRQ0/NMI_OUT/APE	not connected
1	IRQ1/EXT_BG2	Abort Switch
2	IRQ2/EXT_DBG2	DS21354 E1-Controller*
3	IRQ3/WT/BADDR30	PM5350-ATM-Controller*
4	IRQ4/EXT_BG3	RTC IRQ on PM82X module
5	IRQ5/EXT_DBG3	PCI-INTA + PCI -INTB* <small>Note 1</small>
6	IRQ6/CSE0	PCI -INTC*
7	IRQ7/CSE1	PCI -INTD*

* optional devices Note 1: modified on Rev. 2 PCI carrier board

5.15 The ATX and PWR Power Supply Connectors

The CR826 is supplied with all necessary voltages via the 20 pin ATX connector by a ATX compatible power supply. The CR826 and a mounted power module use 5V and 3.3V. The +/-12V supply is only used for certain I/O modules or an extension module connected to the wrap connector PWR.

The 20-pin wrap connector PWR is 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
Pin1	Pin 1	+3.3V
Pin 3	Pin 2	+3.3V
Pin 5	Pin 3	Ground
Pin 7	Pin 4	+5V
Pin 9	Pin 5	Ground
Pin 11	Pin 6	+5V
Pin 13	Pin 7	Ground
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
Ground	Pin 13	Pin 6
Power On	Pin 14	Pin 8
Ground	Pin 15	Pin 10
Ground	Pin 16	Pin 12
Ground	Pin 17	Pin 14
n.c.	Pin 18	Pin 16
+5V	Pin 19	Pin 18
+5V	Pin 20	Pin 20

5.16 The Backup Feature

The backup feature of the PM82X is used to protect the **RTC** as well as the **SRAM** area. The backup power is supplied for short time storage by a service free gold capacitor. For **long time** backup, the necessary power can be supplied by a lithium cell (CR2430) onboard the CR826. The lithium cell can be disconnected by jumper BAT. The backup feature is enabled, if the jumper BAT is installed.

5.17 The I²C Bus

The I²C bus onboard the PM82X is controlled via the SDA (port D15) and SCL (port D14) pins of the MPC82XX and drives a real-time clock, an EEPROM and a system hardware monitor device. For extension purposes, this I²C bus is accessible via the 16 pin wrap connector SPI, which also contains the signals for the SPI bus.

SPI	Signal	MPC82XX	Signal	SPI
Pin 1	SEL	Port D19	GND	Pin 2
Pin 3	CLK	Port D18	n.c.	Pin 4
Pin 5	MOSI	Port D17	n.c.	Pin 6
Pin 7	MISO	Port D16	n.c.	Pin 8
Pin 9	n.c.		n.c.	Pin 10
Pin 11	n.c.		n.c.	Pin 12
Pin 13	SDA	Port D15	n.c.	Pin 14
Pin 15	SCL	Port D14	GND	Pin 16

5.18 The SPI Bus

The SPI bus onboard the PM82X is controlled via the following port pins of the MPC82XX. It contain no devices onboard the PM82X or the CR826. For extension purposes, the SPI bus is accessible via the 16 pin wrap connector SPI, which also contains the signals for the I²C bus.

SPI	Signal	MPC82XX	Signal	SPI
Pin 1	SEL	Port D19	GND	Pin 2
Pin 3	CLK	Port D18	n.c.	Pin 4
Pin 5	MOSI	Port D17	n.c.	Pin 6
Pin 7	MISO	Port D16	n.c.	Pin 8
Pin 9	n.c.		n.c.	Pin 10
Pin 11	n.c.		n.c.	Pin 12
Pin 13	SDA	Port D15	n.c.	Pin 14
Pin 15	SCL	Port D14	GND	Pin 16

5.19 The *miriac*™ Module Connectors

The CR826 uses two 140 pin connectors to link all power, bus and communication lines to the *miriac*™ Power Module PM82X.

5.19.1 Pin Assignment of the Connector ST1

Pin	Signal	used for:		Signal	Pin
1	ground			ground	2
3	JTMS	Debug	n.c.	EXTCLK	4
5	JTCK	Debug	PCI	CLKIN	6
7	JTRST#	Debug		n.c.	8
9	JTDO	Debug		n.c.	10
11	JTDI	Debug	n.c.	PCIE#	12
13	LA31	ATM/E1	ATM/E1	LA30	14
15	LA29	ATM/E1	ATM/E1	LA28	16
17	ground			ground	18
19	LD30	PCI	PCI	LD31	20
21	LD28	PCI	PCI	LD29	22
23	LD26	PCI	PCI	LD27	24
25	LD24	PCI	PCI	LD25	26
27	LD22	PCI	PCI	LD23	28
29	LD20	PCI	PCI	LD21	30
31	LD18	PCI	PCI	LD19	32
33	LD16	PCI	PCI	LD17	34
35	ground			ground	36
37	CBE2#	PCI	PCI	CBE3#	38
39	LA27	ATM/E1	ATM/E1	LA26	40
41	LA25	ATM/E1	ATM/E1	LA24	42
43	LA23	PCI	PCI	LA22	44
45	LA21	PCI	PCI	LA20	46
47	LA19	PCI	PCI	LA18	48
49	LA17	PCI	PCI	LA16	50
51	LA15	PCI	PCI	LA14	52
53	ground			ground	54
55	LD14	PCI	PCI	LD15	56
57	LD12	PCI	PCI	LD13	58
59	LD10	PCI	PCI	LD11	60
61	LD8	PCI	PCI	LD9	62
63	LD6	ATM/E1	ATM/E1	LD7	64
65	LD4	ATM/E1	ATM/E1	LD5	66
67	LD2	ATM/E1	ATM/E1	LD3	68
69	LD0	ATM/E1	ATM/E1	LD1	70

pin assignment of the connector ST1 continued

Pin	Signal	used for:		Signal	Pin
71	ground			ground	72
73	CBE0#	PCI	PCI	CBE1#	74
75	n.c.			n.c.	76
77	LGPL2	ATM	n.c.	LSDQM1#	78
79	LGPL0	n.c.	n.c.	LSDQM2#	80
81	LGPL1	n.c.	n.c.	LSDQM0#	82
83	LGPL3	n.c.	n.c.	LSDQM3#	84
85	LGPL4	n.c.	ATM/E1	LWR#	86
87	LGPL5	n.c.	n.c.	BCTL#	88
89	ground			ground	90
91	CS4#	n.c.	n.c.	CS5#	92
93	CS6#	n.c.	E1	CS7#	94
95	CS8#	ATM	n.c.	CS9#	96
97	n.c.			n.c.	98
99	n.c.			n.c.	100
101	n.c.			n.c.	102
103	n.c.			n.c.	104
105	n.c.			n.c.	106
107	ground			ground	108
109	STDBY	Battery	n.c.	IRQ0#	110
111	KRST#	Reset Switch	Abort-Key	IRQ1#	112
113	QREQ#	Debug	E1	IRQ2#	114
115	CSTPO#	Debug	ATM	IRQ3#	116
117	SRST#	Debug	PCI	IRQ4#	118
119	HRST#	ATM	PCI	IRQ5#	120
121	PORST#	n.c.	PCI	IRQ6#	122
123	PRST#	n.c.	PCI	IRQ7#	124
125	ground			ground	126
127	n.c.			n.c.	128
129	n.c.			n.c.	130
131	VDD			VDD	132
133	VDD			VDD	134
135	VDD			VDD	136
137	VDD			VDD	138
139	ground			ground	140

The carrier board CR826 uses the mating plugs AMP 0179031-6 with 0,8mm pitch.
The used connectors on the PM82X are 140 pin receptacles.
(e.g. FCI 61082-14 or AMP 0177983-6 series)

5.19.2 Pin Assignment of the Connector ST2

Pin	Signal	used for:		Signal	Pin
1	ground			ground	2
3	PD31	SCC1-RXD	UT-RXSOC	PB31	4
5	PD30	UT-TXENB	UT-TXSOC	PB30	6
7	PD29	SCC1-RTS	UT-RCLAV	PB29	8
9	PD28	config. MACH ¹	SCC1-TXD	PB28	10
11	PD27	SCC2-TXD	UT-TXD(0)	PB27	12
13	PD26	SCC2-RTS	UT-TXD(1)	PB26	14
15	PD25	LED8	UT-TXD(4)	PB25	16
17	ground			ground	18
19	PD24	LED7	UT-TXD(5)	PB24	20
21	PD23	SCC3-RTS	UT-TXD(6)	PB23	22
23	PD22	SCC4-RXD	UT-TXD(7)	PB22	24
25	PD21	SCC4-TXD	UT-RXD(7)	PB21	26
27	PD20	SCC4-RTS	UT-RXD(6)	PB20	28
29	PD19	SPI-SEL	UT-RXD(5)	PB19	30
31	PD18	SPI-CLK	UT-RXD(4)	PB18	32
33	PD17	SPI-MOSI	config. MACH ¹	PB17	34
35	ground			ground	36
37	PD16	SPI-MISO	config. MACH ¹	PB16	38
39	PD15	I ² C-SDA	SCC2-RXD	PB15	40
41	PD14	I ² C-SCL	SCC3-RXD	PB14	42
43	PD13	S2M-TXD	config. MACH ¹	PB13	44
45	PD12	S2M-RXD	config. MACH ¹	PB12	46
47	PD11	config. MACH ¹	S0-M/S#	PB11	48
49	PD10	config. MACH ¹	S0-TE/NT#	PB10	50
51	PD9	UT-RXPRTY	UT-TXD(2)	PB9	52
53	ground			ground	54
55	PD8	UT-TXPRTY	SCC3-TXD	PB8	56
57	PD7	DIP-SW8	UT-RXD(3)	PB7	58
59	PD6	DIP-SW7	UT-RXD(2)	PB6	60
61	PD5	config. MACH ¹	UT-RXD(1)	PB5	62
63	PD4	SMC2-RXD	UT-RXD(0)	PB4	64
65	n.c.			n.c.	66
67	PC31	S0-CLK	MII-COL	PA31	68
69	PC30	UT-TXD(3)	MII-CRS	PA30	70

pin assignment of the connector ST2 continued

Pin	Signal	used for:		Signal	Pin
71	ground			ground	72
73	PC29	SCC1-CTS	MII-TXER	PA29	74
75	PC28	S2M-CLK SCC2-CTS	MII-TXEN	PA28	76
77	PC27		MII-RXDV	PA27	78
79	PC26		MII-RXER	PA26	80
81	PC25		DIP-SW4	PA25	82
83	PC24	MII-MDIO	DIP-SW3	PA24	84
85	PC23	MII-MDC	DIP-SW2	PA23	86
87	PC22	MII-TXCLK	DIP-SW1	PA22	88
89	ground			ground	90
91	PC21	MII-RXCLK	MII-TXD(3)	PA21	92
93	PC20		MII-TXD(2)	PA20	94
95	PC19	UT-RXCLK	MII-TXD(1)	PA19	96
97	PC18	config. MACH ¹	MII-TXD(0)	PA18	98
99	PC17	UT-TXCLK	MII-RXD(0)	PA17	100
101	PC16	config. MACH ¹	MII-RXD(1)	PA16	102
103	PC15	SMC2-TXD	MII-RXD(2)	PA15	104
105	PC14	SCC1-DCD	MII-RXD(3)	PA14	106
107	ground			ground	108
109	PC13	SCC2-CTS	LED4	PA13	110
111	PC12	SCC2-DCD	LED3	PA12	112
113	PC11	SCC3-CTS	LED2	PA11	114
115	PC10	SCC3-DCD	LED1	PA10	116
117	PC9	SCC4-CTS	S0-Din	PA9	118
119	PC8	SCC4-DCD	S0-Dout	PA8	120
121	PC7	DIP-SW6		PA7	122
123	PC6	DIP-SW5	config. MACH ¹	PA6	124
125	ground			ground	126
127	PC5	UT-TXCLAV	MII-PAUSE	PA5	128
129	PC4	UT-RXENB		PA4	130
131	PC3	LED6	MII-PWRDN	PA3	132
133	PC2	LED5	MII-TXSL1	PA2	134
135	PC1	S0-Reset#	MII-TXSL0	PA1	136
137	PC0		MII-MDINT#	PA0	138
139	ground			ground	140

Note 1: These signals are not used on version 1 boards.
MACH device J15 (PLD) is mounted on version 2 boards only.

5.20 The Add-On Module Connectors

The CR826 features two 64-pin wrap connectors that carry all I/O lines from ST2 for connecting additional peripheral circuitry.

5.20.1 Pin Assignment of the Connector ST3

Pin	Signal	used for:		Signal	Pin
1	ground		SCC1-RXD	PD31	2
3	PD30	UT-TXENB	SCC1-RTS	PD29	4
5	PD28	config. MACH ¹	SCC2-TXD	PD27	6
7	PD26	SCC2-RTS	LED8	PD25	8
9	PD24	LED7	SCC3-RTS	PD23	10
11	PD22	SCC4-RXD	SCC4-TXD	PD21	12
13	PD20	SCC4-RTS	SPI-SEL	PD19	14
15	PD18	SPI-CLK	SPI-MOSI	PD17	16
17	PD16	SPI-MISO	I ² C-SDA	PD15	18
19	PD14	I ² C-SCL	S2M-TXD	PD13	20
21	PD12	S2M-RXD	config. MACH ¹	PD11	22
23	PD10	config. MACH ¹	UT-RXPRTY	PD9	24
25	PD8	UT-TXPRTY	DIP-SW8	PD7	26
27	PD6	DIP-SW7	config. MACH ¹	PD5	28
29	PD4	SMC2-RXD		ground	30
31	ground		S0-CLK	PC31	32
33	PC30	UT-TXD(3)	SCC1-CTS	PC29	34
35	PC28	S2M-CLK SCC2-CTS		PC27	36
37	PC26			PC25	38
39	PC24	MII-MDIO	MII-MDC	PC23	40
41	PC22	MII-TXCLK	MII-RXCLK	PC21	42
43	PC20		UT-RXCLK	PC19	44
45	PC18	config. MACH ¹	UT-TXCLK	PC17	46
47	PC16	config. MACH ¹	SMC2-TXD	PC15	48
49	PC14	SCC1-DCD	SCC2-CTS	PC13	50
51	PC12	SCC2-DCD	SCC3-CTS	PC11	52
53	PC10	SCC3-DCD	SCC4-CTS	PC9	54
55	PC8	SCC4-DCD	DIP-SW6	PC7	56
57	PC6	DIP-SW5	UT-TXCLAV	PC5	58
59	PC4	UT-RXENB	LED6	PC3	60
61	PC2	LED5	S0-Reset#	PC1	62
63	PC0			ground	64

Note 1: These signals are not used on version 1 boards.

MACH device J15 (PLD) is mounted on version 2 boards only.

5.20.2 Pin Assignment of the Connector ST4

Pin	Signal	used for:		Signal	Pin
1	ground		UT-RXSOC	PB31	2
3	PB30	UT-TXSOC	UT-RCLAV	PB29	4
5	PB28	SCC1-TXD	UT-TXD(0)	PB27	6
7	PB26	UT-TXD(1)	UT-TXD(4)	PB25	8
9	PB24	UT-TXD(5)	UT-TXD(6)	PB23	10
11	PB22	UT-TXD(7)	UT-RXD(7)	PB21	12
13	PB20	UT-RXD(6)	UT-RXD(5)	PB19	14
15	PB18	UT-RXD(4)	config. MACH ¹	PB17	16
17	PB16	config. MACH ¹	SCC2-RXD	PB15	18
19	PB14	SCC3-RXD	config. MACH ¹	PB13	20
21	PB12	config. MACH ¹	S0-M/S#	PB11	22
23	PB10	S0-TE/NT#	UT-TXD(2)	PB9	24
25	PB8	SCC3-TXD	UT-RXD(3)	PB7	26
27	PB6	UT-RXD(2)	UT-RXD(1)	PB5	28
29	PB4	UT-RXD(0)		ground	30
31	ground		MII-COL	PA31	32
33	PA30	MII-CRS	MII-TXER	PA29	34
35	PA28	MII-TXEN	MII-RXDV	PA27	36
37	PA26	MII-RXER	DIP-SW4	PA25	38
39	PA24	DIP-SW3	DIP-SW2	PA23	40
41	PA22	DIP-SW1	MII-TXD(3)	PA21	42
43	PA20	MII-TXD(2)	MII-TXD(1)	PA19	44
45	PA18	MII-TXD(0)	MII-RXD(0)	PA17	46
47	PA16	MII-RXD(1)	MII-RXD(2)	PA15	48
49	PA14	MII-RXD(3)	LED4	PA13	50
51	PA12	LED3	LED2	PA11	52
53	PA10	LED1	S0-Din	PA9	54
55	PA8	S0-Dout		PA7	56
57	PA6	config. MACH ¹	MII-PAUSE	PA5	58
59	PA4		MII-PWRDN	PA3	60
61	PA2	MII-TXSL1	MII-TXSL0	PA1	62
63	PA0	MII-MDINT#		ground	64

Note 1: These signals are not used on version 1 boards.
MACH device J15 (PLD) is mounted on version 2 boards only.

5.21 Pin Assignment of the PCI Connector ST5

Pin	PCI Signal	Local Bus Signal		PCI Signal	Pin
b1	-12V	-12V	nc	nc	a1
b2	nc	nc	+12V	+12V	a2
b3	GND	GND	nc	nc	a3
b4	nc	nc	nc	nc	a4
b5	+5V	+5V	+5V	+5V	a5
b6	+5V	+5V	IRQ5#	INTA#	a6
b7	INTB#	IRQ5#	IRQ6#	INTC#	a7
b8	INTD#	IRQ7#	+5V	+5V	a8
b9	nc	nc	nc	nc	a9
b10	nc	nc	+3,3V I/O	+3,3V I/O	a10
b11	nc	nc	nc	nc	a11
b12	GND	GND	GND	GND	a12
b13	GND	GND	GND	GND	a13
b14	nc	nc	nc	nc	a14
b15	GND	GND	LA28	RST#	a15
b16	PCLKA	PCLKA	+3,3V	+3,3V I/O	a16
b17	GND	GND	LA26	GNT0#/GNT1#	a17
b18	REQ0#/REQ1#	LA24	GND	GND	a18
b19	+3,3V I/O	+3,3V	nc	nc	a19
b20	AD31	LD31	LD30	AD30	a20
b21	AD29	LD29	+3,3V	+3,3V	a21
b22	GND	GND	LD28	AD28	a22
b23	AD27	LD27	LD26	AD26	a23
b24	AD25	LD25	GND	GND	a24
b25	+3,3V	+3,3V	LD24	AD24	a25
b26	C/BE3#	CBE3#	LD13 Note 1	IDSEL Note 1	a26
b27	AD23	LD23	nc	nc	a27
b28	GND	GND	LD22	AD22	a28
b29	AD21	LD21	LD20	AD20	a29
b30	AD19	LD19	GND	GND	a30
b31	+3,3V	+3,3V	LD18	AD18	a31
b32	AD17	LD17	LD16	AD16	a32

Note 1: This pin is connected to pin a46 via a 22ohm resistor.

Pin Assignment of the PCI Connector ST5 (continued)

Pin	PCI Signal	Local Bus Signal		PCI Signal	Pin
b33	CBE2#	CBE2#	+3,3V	+3,3V	a33
b34	GND	GND	LA15	FRAME#	a34
b35	IRDY#	LA17	GND	GND	a35
b36	+3,3V	+3,3V	LA16	TRDY#	a36
b37	DEVSEL#	LA19	GND	GND	a37
b38	GND	GND	LA18	STOP#	a38
b39	LOCK#	LOCK#	+3,3V	+3,3V	a39
b40	PERR#	LA21	nc	nc	a40
b41	+3,3V	+3,3V	nc	nc	a41
b42	SERR#	LA22	GND	GND	a42
b43	+3,3V	+3,3V	LA14	PAR	a43
b44	CBE1#	CBE1#	LD15	AD15	a44
b45	AD14	LD14	+3,3V	+3,3V	a45
b46	GND	GND	LD13	AD13	a46
b47	AD12	LD12	LD11	AD11	a47
b48	AD10	LD10	GND	GND	a48
b49	GND	GND	LD09	AD09	a49
b50	nc	nc	nc	nc	a50
b51	nc	nc	nc	nc	a51
b52	AD08	LD08	CBE0#	CBE0#	a52
b53	AD07	LD07	+3,3V	+3,3V	a53
b54	+3,3V	+3,3V	LD06	AD06	a54
b55	AD05	LD05	LD04	AD04	a55
b56	AD03	LD03	GND	GND	a56
b57	GND	GND	LD02	AD02	a57
b58	AD01	LD01	LD00	AD00	a58
b59	+3,3V I/O	+3,3V	+3,3V	+3,3V I/O	a59
b60	nc	nc	nc	nc	a60
b61	+5V	+5V	+5V	+5V	a61
b62	+5V	+5V	+5V	+5V	a62



Attention!

Although a 5V PCI connector is mounted, only 3.3V compatible PCI boards must be used in this slot!

Note! The PCI interface can **not** be used on CR826 boards with ATM or E1 interface mounted!

5.22 Additional test connector

Next to the PCI slot, there is a 1x32 pin socket ST12 offering access to the remaining processor signals not available elsewhere on the board. For best ease of use, it is recommendable to use a specialized PCI plug-in board with an extra 90° wrap plug to fit this socket.

5.22.1 Pin Assignment of the Connector ST12

Pin:	Signal	ST1 Pin	Description:	MPC82XX Port:
1	GND	-	board ground	
2	EXTCLK	4	External clock out	equal to CPUCLK
3	n.c.	-	-	
4	n.c.	-	-	
5	n.c.	-	-	
6	LSDQM1#	78	byte select line 1	local bus
7	LSDQM2#	80	byte select line 2	local bus
8	LSDQM0#	82	byte select line 0	local bus
9	LSDQM3#	84	byte select line 3	local bus
10	LWR#	86	write enable	local bus
11	BCTL#	88	bus control line	BCTL1# line
12	n.c.	-	-	
13	LGPL0	79	GPL0 / SDRAM-A10	local bus
14	LGPL1	81	GPL1 / SDRAM-WE	local bus
15	LGPL2	77	GPL2 / SDRAM-RAS	local bus
16	LGPL3	83	GPL3 / SDRAM-CAS	local bus
17	LGPL4	85	GPL4 / GPCM-TA	local bus
18	LGPL5	87	GPL5	local bus
19	n.c.	-	-	
20	CS4#	91	chip select line 4	local or 603 bus
21	CS5#	92	chip select line 5	local or 603 bus
22	CS6#	93	chip select line 6	local or 603 bus
23	CS7#	94	chip select line 7	local or 603 bus
24	CS8#	95	chip select line 8	local or 603 bus
25	CS9#	96	chip select line 9	local or 603 bus
26	n.c.	-	-	
27	IRQ0#	110	interrupt line 0	IRQ0#
28	E1IRQ#	114	interrupt line 2	IRQ2#
29	ATMIR#	116	interrupt line 3	IRQ3#
30	PORST#	121	power on reset out	PORST#
31	PRST#	123	power on reset in	
32	GND	-	-	

5.23 The ISDN/S0 Interface

The CR826 can be **optionally** equipped with a ISDN-S0 interface, driven by the MC145574 transceiver. It is accessible via the RJ45 connector ST8 and uses the following port pins of the MPC82XX.

MC145574 signal:	connected to:	description:
TE/NT#	MPC82XX-Port B10	TE or NT mode
M/S#	MPC82XX-Port B11	master / slave
FSC	configuration MACH	frame sync clock
DCL	configuration MACH	device clock
Din	MPC82XX-Port A9	data in
Dout	MPC82XX-Port A8	data out
RESET#	MPC82XX-Port C1	reset input

(# denotes a low active signal)

5.23.1 Pin assignment of the RJ45 connector ST8

Pin:	Signal:	Description:
1	n.c.	
2	n.c.	
3	TxD-	transmit data (-)
4	RxD-	receive data (-)
5	RxD+	receive data (+)
6	TxD+	transmit data (+)
7	n.c.	
8	n.c.	

5.24 The ISDN/E1 Interface

The CR826 can be **optionally** equipped with a ISDN-E1 interface, driven by the DS21354 transceiver. It is accessible via the RJ45 connector ST11 and uses the following port pins of the MPC82XX. The pin configuration of ST11 can be adapted to any demands by the wrap fields S2MA and S2MB. The DS21354 is controlled by the CS7# select line of the MPC82XX on its local bus side as an 8 bit device with register offset of \$1. The interrupt line of the DS21354 is connected to the MPC82XX IRQ2# line.

DS21354 signal:	connected to:	description:
RSER	MPC82XX-Port D12	receive serial data
TSER	MPC82XX-Port D13	transmit serial data
8MCLK	configuration MACH ¹	8.192MHz clock
TSSYNC	configuration MACH ¹	transmit system sync
TSYNC	configuration MACH ¹	transmit sync
8XCLK	configuration MACH ¹	8 x clock
TSYSCLK	configuration MACH ¹	transmit system clock
TCHBLK	configuration MACH ¹	transmit channel block
TCLK	configuration MACH ¹	transmit clock
MCLK	configuration MACH ¹	master clock input
RMSYNC	configuration MACH ¹	receive multiframe sync
RFSYNC	configuration MACH ¹	receive frame sync
RSYNC	configuration MACH ¹	receive sync
RLOS	configuration MACH ¹	receive loss of sync
RSYSCLK	configuration MACH ¹	receive system clock
RCHBLK	configuration MACH ¹	receive channel block
RCLK	configuration MACH ¹	receive clock
RCL	configuration MACH ¹	receive carrier loss
FMS	configuration MACH	framer mode select

Note 1: These signals are not used on version 1 boards.

MACH device J15 (PLD) is mounted on version 2 boards only.

The configuration MACH (J15) device is used to route any combination of the according port lines of the MPC82XX to the DS21354 controller. The following port pins are connected to the configuration MACH and can be used for the S0 and the E1 interface.

MPC82XX lines connected to the configuration MACH device			
Port A:	Port B:	Port C:	Port D:
A6	B12	C16	D5
	B13	C18	D10
	B16		D11
	B17		D28

5.24.1 Pin assignment of the RJ45 connector ST11

The table shows the physical outlay of the E1 connection area:

RJ45	wrap connector		
ST11	S2MB	S2MA	Description:
1	1		
2	2		
3	3	1	receive data (+)
4	4	2	receive data (-)
5	5	3	transmit data (+)
6	6	4	transmit data (-)
7	7		
8	8		

5.25 The ATM Interface

The CR826 offers an **optional** ATM interface powered by the PM5350 S/UNI-ULTRA from PMC-Sierra. The interface can be **either** realized optical **or** by a twisted pair cable. The fiber interface uses the optical transceiver HFBR-5203 in location J11, while the twisted pair interface is connected via ST9. It uses the following port pins of the MPC82XX. The PM5350 is controlled by the CS8# select line of the MPC82XX on its local bus side as an 8 bit device with register offset of \$1. The interrupt line of the PM5350 is connected to the MPC82XX IRQ3# line.

PM5350 signal:	connected to:	description:
D0-D7	MPC82XX-Local Bus	D7-D0 endian swapped
A0-A7	MPC82XX-Local Bus	A31-A24 endian swapped
INTB	MPC82XX-IRQ3#	interrupt line
RSTB	MPC82XX-HRST#	reset line
CSB	MPC82XX-CS8#	select line
RDB	MPC82XX-PGPL2	read enable
WRB	MPC82XX-LWR#	write enable
TSOC	MPC82XX-Port B30	transmit start of cell
TXPRTY	MPC82XX-Port D8	transmit parity
TDAT(7-4)	MPC82XX-Port B(22-25)	transmit cell data
TDAT(3)	MPC82XX-Port C30	transmit cell data
TDAT(2)	MPC82XX-Port B9	transmit cell data
TDAT(1-0)	MPC82XX-Port B(26-27)	transmit cell data
TWRENB	MPC82XX-Port D30	transmit write enable
TFCLK	MPC82XX-Port C17	transmit write clock
TCA	MPC82XX-Port C5	transmit cell available
RSOC	MPC82XX-Port B31	receive start of cell
RXPRTY	MPC82XX-Port D9	receive parity
RDAT(7-4)	MPC82XX-Port B(21-18)	receive cell data
RDAT(3-0)	MPC82XX-Port B(7-4)	receive cell data
RCA	MPC82XX-Port B29	receive cell available
RRDENB	MPC82XX-Port C4	receive read enable
RFCLK	MPC82XX-Port C19	receive read clock

5.25.1 Pin assignment of the RJ45 connector ST9

RJ45	Description:
1	transmit data (+)
2	transmit data (-)
3	rx shield term
4	tx shield term
5	tx shield term
6	rx shield term
7	receive data (+)
8	receive data (-)

6. Summary of Jumpers

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

Size:	Name:	Default:	Position:	Function:
1x2	AA		1-2	8 bit dip switch buffer enabled
		#	---	8 bit dip switch buffer disabled
1x2	BAT		1-2	Lithium Cell connected
		#	---	Lithium Cell disconnected
1x2	PCIE		1-2	local bus as PCI configuration
		#	---	local bus standard configuration
1x2	CMT		1-2	S0/S2M common mode link
		#	---	S0/S2M no common mode link
1x2	RXT		1-2	S0/S2M 120R receive line termination
		#	---	S0/S2M no receive line termination
1x2	TXT		1-2	S0/S2M 120R transmit line termination
		#	---	S0/S2M no transmit line termination

6.1 Summary of PCI Configuration Resistors

The PM82X, depending on the Processor type, supports either a LocalBus interface or PCI. When set to PCI mode (PCIE Jumper set on CR826), some external signals are used during reset to configure e.g. clock setting of the MPC82XX. On the CR826 these signals are defined by resistor R103 – R120 as shown in the following table.

Resistor (10K)	Signal	Level	Default	connected to ST1 Pin	Function
R103	LGPL0	high		79	PCI Clock configuration <small>Note 1</small>
R112	LGPL0	low	#	79	PCI Clock configuration <small>Note 1</small>
R104	LGPL1	high	#	81	PCI Clock configuration <small>Note 1</small>
R113	LGPL1	low		81	PCI Clock configuration <small>Note 1</small>
R105	LGPL2	high		77	PCI Clock configuration <small>Note 1</small>
R114	LGPL2	low	#	77	PCI Clock configuration <small>Note 1</small>
R106	LGPL3	high	#	83	PCI Clock configuration <small>Note 1</small>
R115	LGPL3	low		83	PCI Clock configuration <small>Note 1</small>
R107	LGPL5	high	#	87	PCI Clock = 33 MHz
R116	LGPL5	low		87	PCI Clock = 66 MHz
R108	LSDQM0	high		82	PCI Agent Mode enabled
R117	LSDQM0	low	#	82	PCI Host Mode enabled
R109	LSDQM1	high		78	PCI Arbiter disabled
R118	LSDQM1	low	#	78	PCI Arbiter enabled
R110	LSDQM2	high	#	80	PCI DLL enabled
R119	LSDQM2	low		80	PCI DLL disabled
R111	LSDQM3	high	#	84	reserved, set to high
R120	LSDQM3	low		84	reserved, do not install

R103 – R111 are pull up resistors, R112 – R120 are pull down resistors,

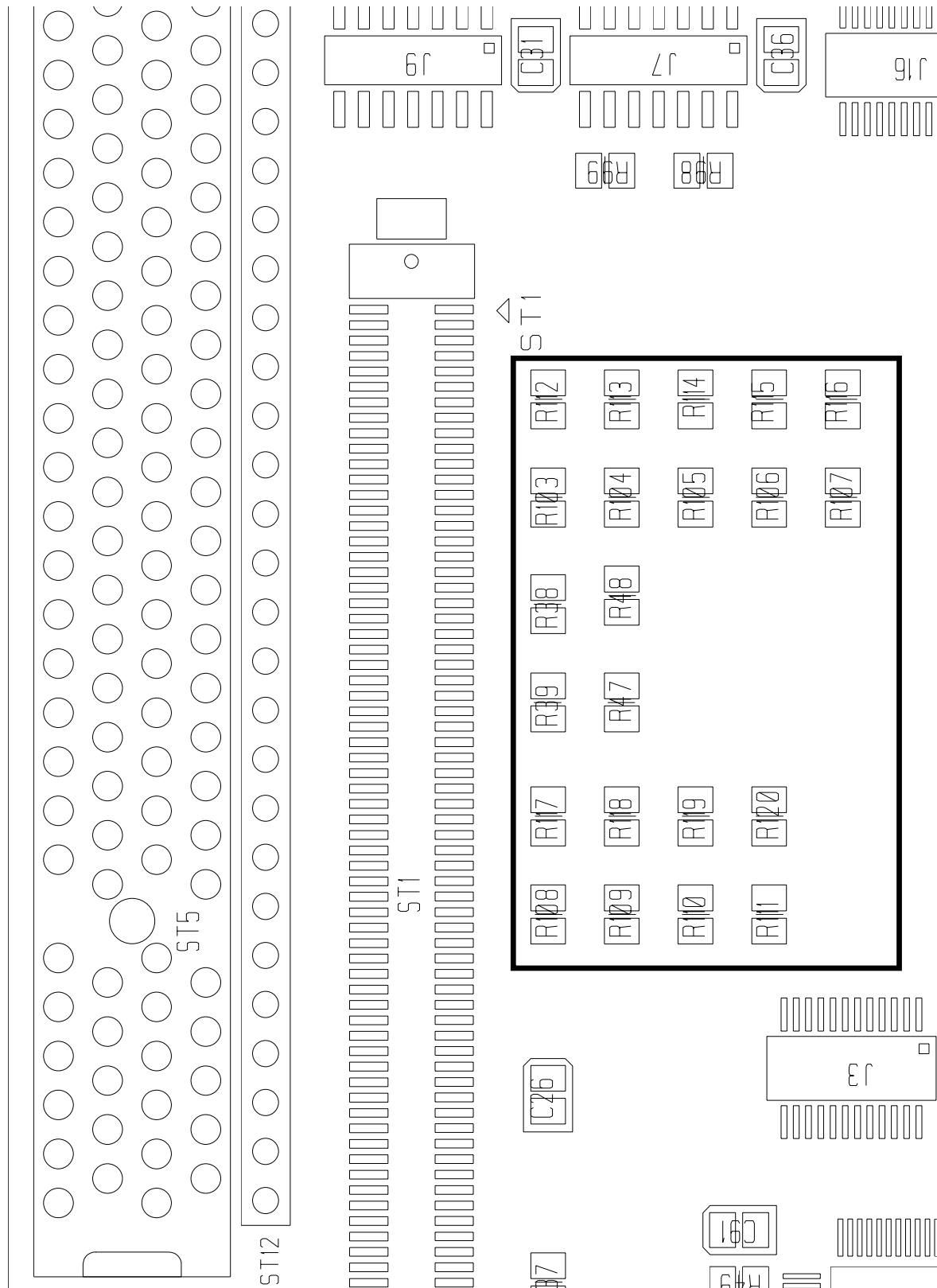
Note 1: Setting of LGPL0 – LGPL3 defines Core, CPM and Bus clock of the MPC82XX in combination with MDCK1 – MDCK3 links on the *miriac*[™] module! Please refer to module documentation (extended clock modes in PCI mode) before changing.

Default setting shown sets CPM-Clock to 133 MHz, Core-Clock to 266 MHz and PCI-Clock to 33 MHz with MDCK 1-2 installed on PM82X.



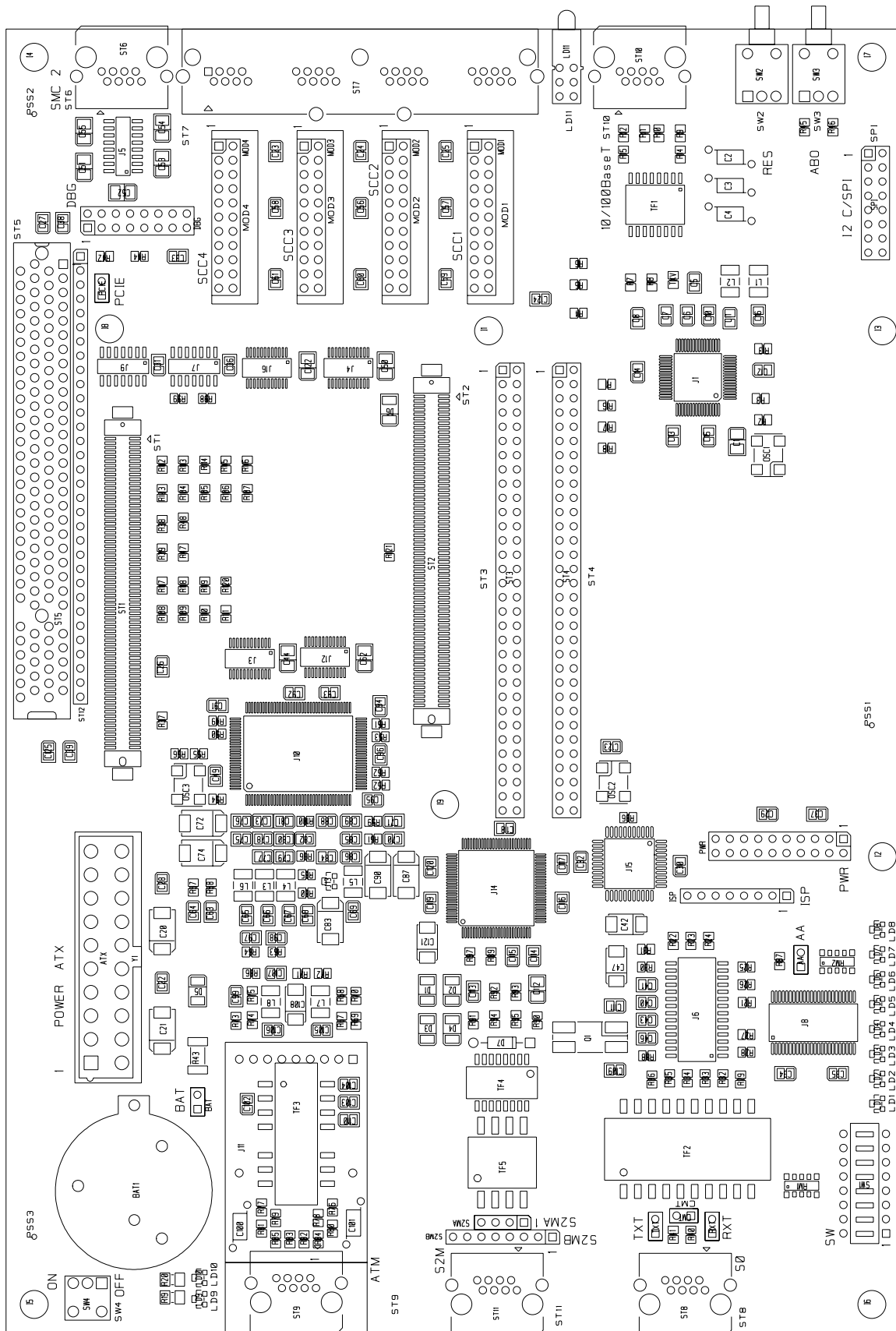
**Never mount both resistors controlling the same signal
(e.g. R103 and R112, R104 and R113 ...) to avoid unpredictable results!**

Summary of PCI Configuration Resistors continued

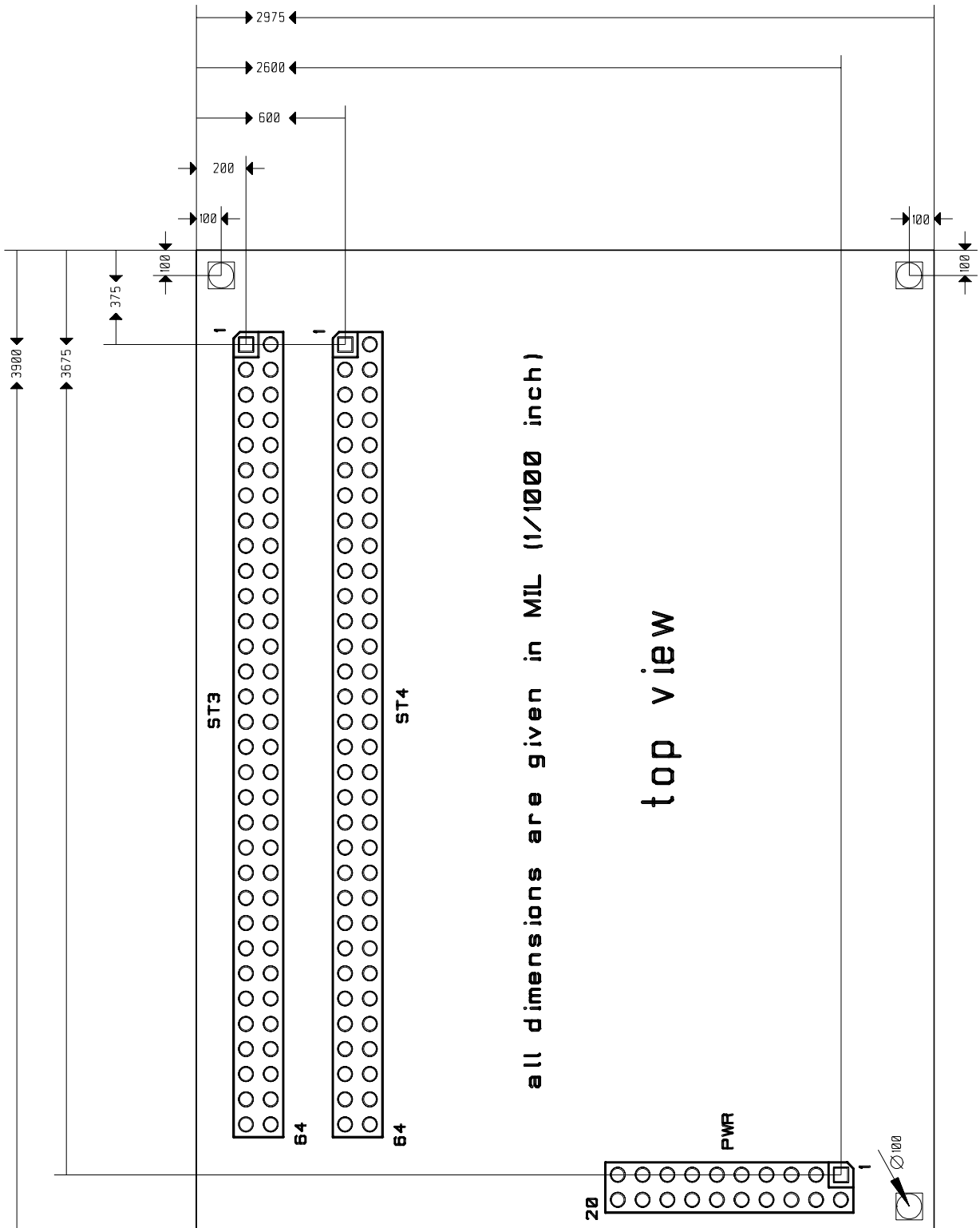


Appendices

Appendix A: Layout Component Side



Appendix B: Physical Dimensions of Extension Module



Appendix C: Schematics CR826 (in printed Manuals only)