Ethernet Prototyping Board
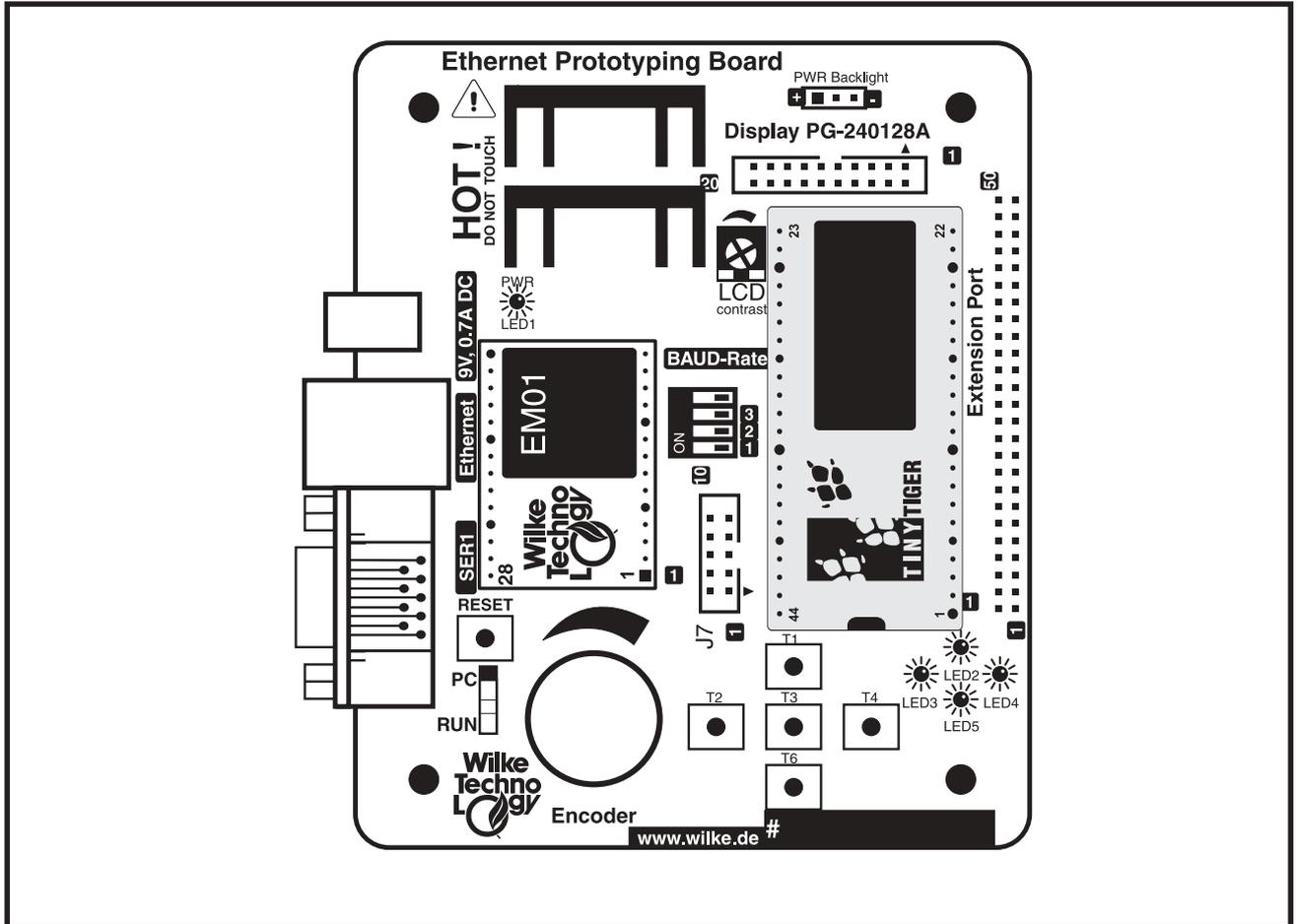
Version 1.1

Wilke Technology
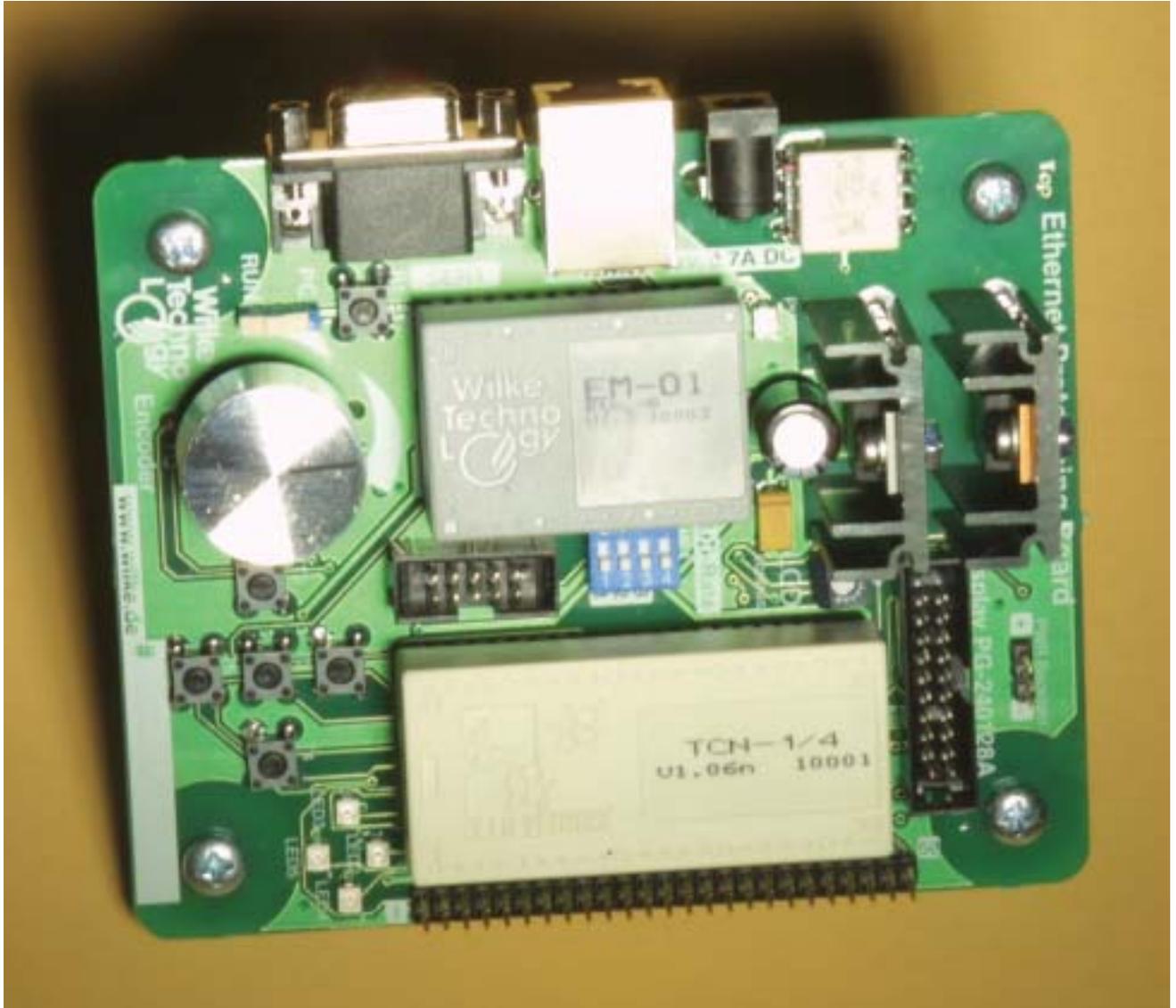
Ethernet Prototyping Board

Overview

Techni cal Documentati on *(side margin)*

The Ethernet Prototyping Board presents the easiest way to develop Applications with connection to the Ethernet. It is a ready to go multitasking computer with Ethernet connection.

You can easily develop your own application by copying and modyfng the schematics and demonstration programs of the prototyping board.

Features:
- Ethernet Adapter EM01
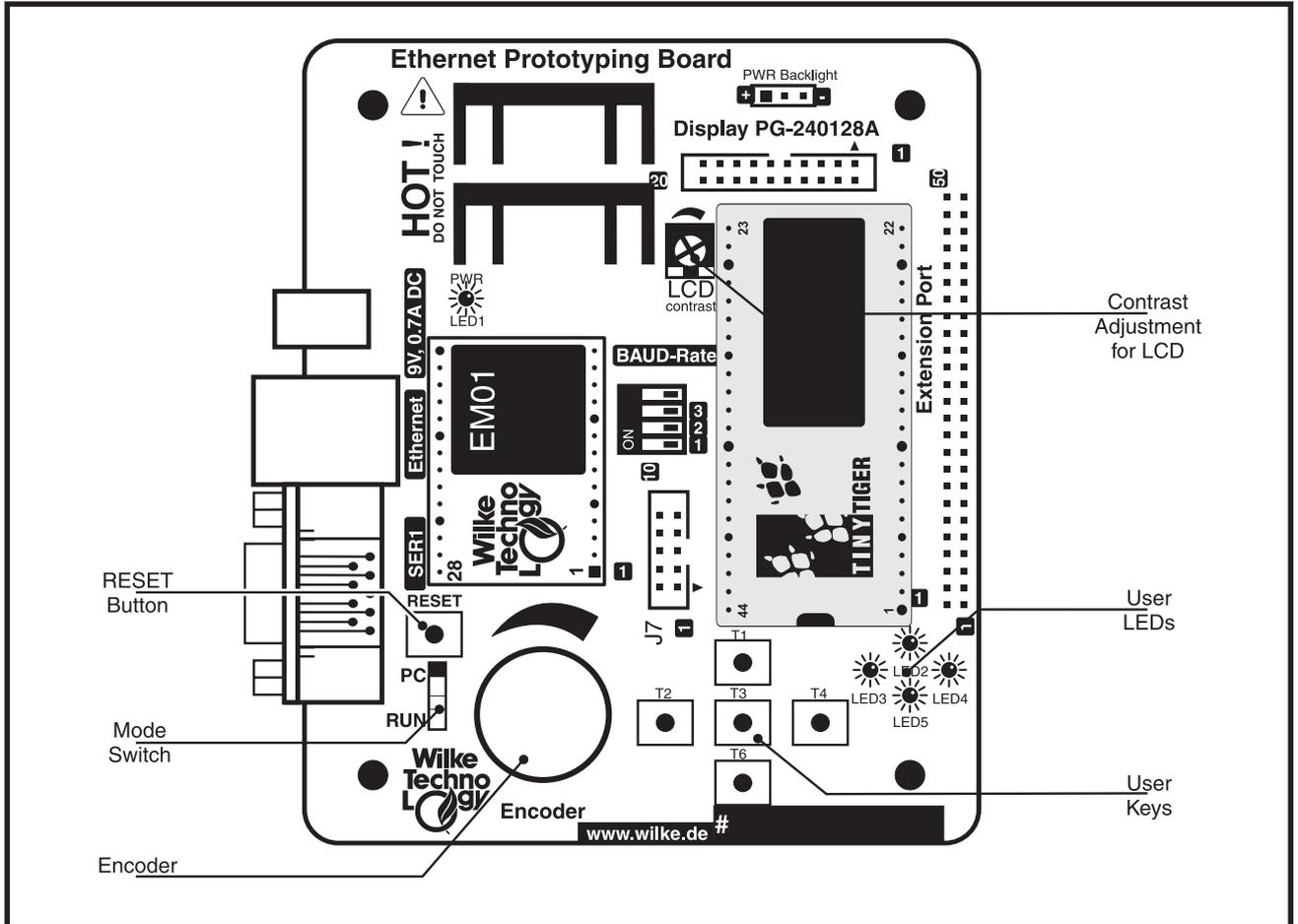- Connector with filter-elements to Ethernet
- Tiny Tiger Multitasking Computer
- RS232 Interface for communication or program download
- Connector for LC Graphic Display
- Power supply for Prototyping board and LCD
- 5 push buttons, 4 LEDs
- Encoder with push button
- Extension Port to connect your own hardware

Size:
- PCB board: 100mm x 120mm
- Overall size: 111mm x 120mm x 37mm

Ethernet Prototyping Board

Control Elements

Ethernet Prototyping Board

PWR Backlight

Display PG-240128A

HOT! DO NOT TOUCH

PWR LED1

LCD contrast

BAUD-Rate

EM01

Wilke Technology

Ethernet 9V, 0.7A DC

SER1 28

Extension Port

TINY TIGER

Contrast Adjustment for LCD

RESET Button

RESET

PC

RUN

Mode Switch

Encoder

Encoder

J7

T1

T2 T3 T4

T6

LED2 LED3 LED4 LED5

User LEDs

User Keys

www.wilke.de #

RESET Button:

Pressing the button will reset the TINY-Tiger and the Ethernet Adapter EM01.

Mode Switch:

Shift the switch to position „RUN" and press RE-SET to start your aplication in RUN-Mode or to „PC" to download a new program into the TINY-Tiger or to run the TINY-Tiger in debug mode.

Encoder:

The encoder can be rotated in both directions without limitation. The rotation creates two transposed pulse chains, indicating both the direction of rotation and the number of the angle steps. The shaft encoder is supported by the DEVICE driver „ENC1_723.TDD". Program menus can be scrolled with the shaft encoder and the additional key function by pressing the axis serves as an enter key. The shaft encoder is connected to the Pins L72 and L73. The key is connected to L87.

Contrast Adjustment:

If you have connected a LC Display, you can adjust the contrast of the display here. **Note**: You can reduce the contrast of the display downto no contrast. If you can't see your outputs at the display increase the contrast by turning the contrast adjustment clockwise. If the screen is too black, reduce the contrast.

User LEDs:

The 4 LEDs can be controlled by your aplication. The LEDs are connected to PORT 3 bits 6 and 7 and to PORT 7 bits 0 and 1. Writing 0 to these port-bits will turn on the LEDs
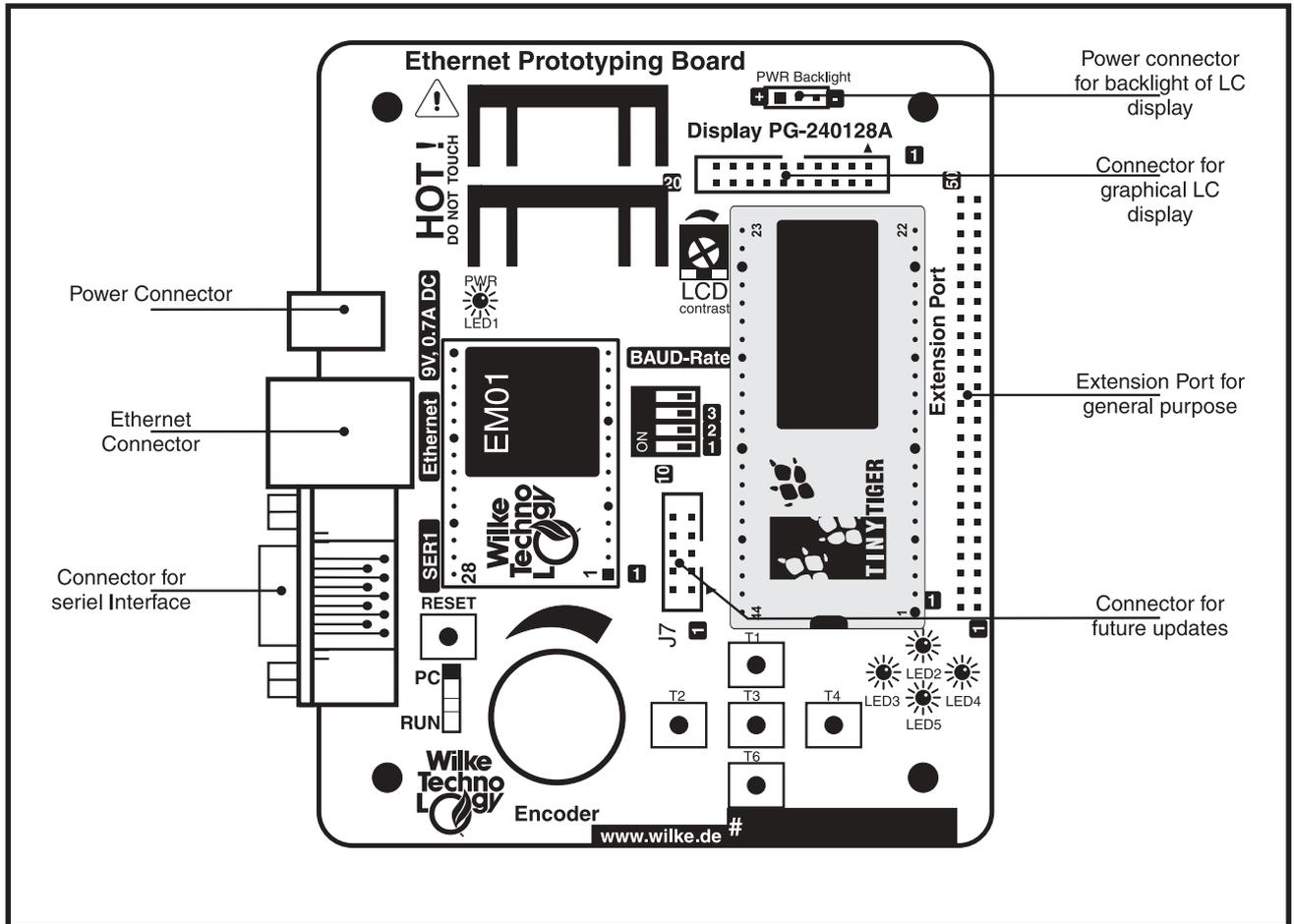
User Keys:

The 5 keys can be read by your aplication reading PORT 6 bits 0 to 4. A bit value of 0 indicates a pressed key. To use the keys, the Eport system must be disabled and before every reading you have to disable the task switching and set the pins to input.

Ethernet Prototyping Board

Connectors

Power Connector:
>Use the power supply shipped with the Ethernet Prototyping Board or one with at least 0.7A and 9V +-10%.

Ethernet Connector:
>Connect the Ethernet here. The used connector of type LF1S028 contains necessary filter elements for the Ehernet connection. You can purchase such connectors at Wilke Technology GmbH.

SER1:
>RS232 Interface of the TINY Tiger. Connect to your PC for running the TINY Tiger in PC Mode or for data transfer.

PWR Backlight:
>Power output for backlight of LC display. This is a current limited power output for the white LED of a display of type PG-240128A.

Display PG-240128A:
>You can connect a LC display of type PG-240128A or compatible here. The display is supported by the device driver "LCD-6963.TDD".

Extension Port:
>All pins of the TINY Tiger are directly connected to the extension port of the Ethernet Prototyping Board. To develop your application you can connect your components here.

Connector J7:
>This connector is reserved for future updates.

Ethernet Prototyping Board

Ethernet Connector

Ethernet Connector top view
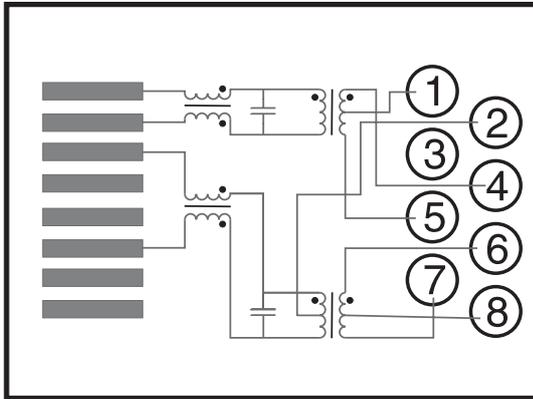
1   connected via 100nF to GND
2   connected via 100nF to GND
3   not connected
4   TX_P positive transmit line
5   TX_M negative transmit line
6   RX_P positive receive line
7   RX_M   negative receive line
8   not connected

Connector

The Ethernet connector of type LF1S028 includes all necessary magnetics and filters to connect the Ethernet Adapter EM01 to the Ethernet.

You cannot connect the EM01 to Ethernet without such elements. The connector is available at Wilke Technology GmbH.

Connection to Ethernet

Use a straight Ethernet cable to connect the Ethernet Prototyping Board to a hub or a switch.

To directly connect two Ethernet Prototyping Boards or directly connect the Ethernet Prototyping Board to a PC use a crosslinked cable.

Technical Documentation (left margin, vertical)

Connector for seriel Interface

9pol SUB D Connector (female)

pin	name
2	TxD
3	RxD
5	GND
7	connected to 8
8	connected to 7
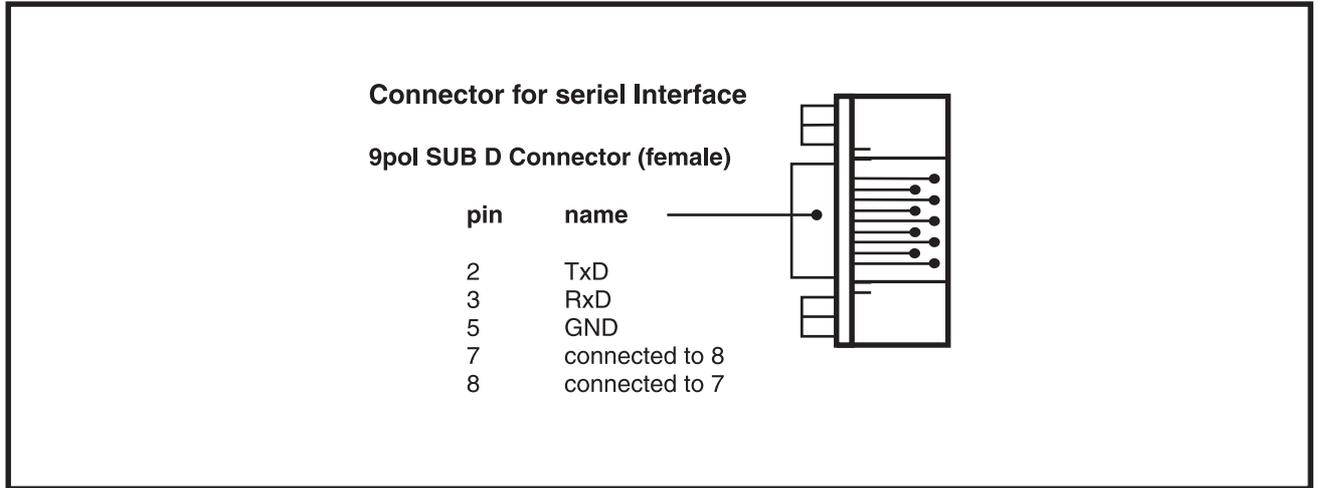
SER1:

Connect the Ethernet Prototyping Board to a PC for running the TINY Tiger in PC mode or for data transfer at the serial Port SER1 with a straight 9 pole RS232 cable.

SER0:

The serial PORT 0 is not implemented on the board.

Pinning:

2 - TXD (output)
Data transmit line of the TINY Tiger
The outgoing data from the Ethernet Prototyping Board are transmitted here.

3 - RxD (input)
Data receive line of the TINY Tiger
The incoming data to the Ethernet Prototyping Board are received here.

5 - GND
System ground

7 and 8
Pin 7 and 8 are tied together to loop back an incoming handshake signal (RTS / CTS)

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Technical Documentation

20-pin m
Contact View

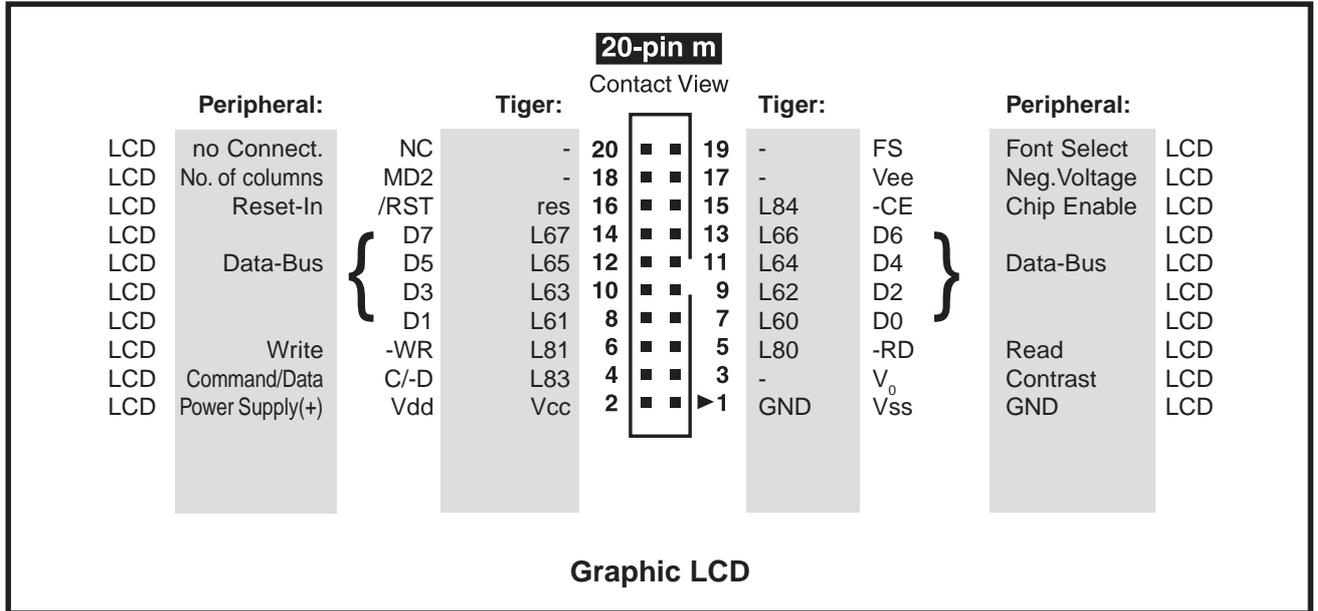| Peripheral:		Tiger:						Tiger:		Peripheral:	
LCD	no Connect.	NC	-	20	■ ■	19	-	FS	Font Select	LCD
LCD	No. of columns	MD2	-	18	■ ■	17	-	Vee	Neg.Voltage	LCD
LCD	Reset-In	/RST	res	16	■ ■	15	L84	-CE	Chip Enable	LCD
LCD		D7	L67	14	■ ■	13	L66	D6		LCD
LCD	Data-Bus	D5	L65	12	■ ■	11	L64	D4	Data-Bus	LCD
LCD		D3	L63	10	■ ■	9	L62	D2		LCD
LCD		D1	L61	8	■ ■	7	L60	D0		LCD
LCD	Write	-WR	L81	6	■ ■	5	L80	-RD	Read	LCD
LCD	Command/Data	C/-D	L83	4	■ ■	3	-	V$_0$	Contrast	LCD
LCD	Power Supply(+)	Vdd	Vcc	2	■ ■ ►1		GND	Vss	GND	LCD

Graphic LCD

With this connector a graphical LC display (Type PG-240128A) can be connected to the Ethernet Prototyping Board.

LCD type: 240 x 128 pixel, T6963C Controller

Selection pins: The displays Font Select (Pin 19) is by default set to low.
The displays Number of Columns Select (Pin 18) is by default set to high.

LCD backlight: Is activated by connecting power to the separate "Power connector for backlight of LC display" on the Ethernet Prototyping Board.

LCD contrast: Set by adjusting the LCD contrast potentiometer on the Ethernet Prototyping Board.

LCD reset: LC display reset is low active, two re-set sources are combined (AND):
- RESET (System reset)
- Tiger output pin L85
so that the LCD is resetted at power-up and by system reset, as well as by explicitly setting Tiger pin P85 to low.

LCD bus lines: Data bus:

Data I/O	D0	L60
	...	...
	D7	L67

Control bus:

Read	-RD	L80
Write	-WR	L81
Command / Data	C/-D	L83
Chip Enable	-CE	L84
Reset-In	/RST	L85
		and
		-Reset

Pin description	Pin no.			Pin no.	Pin description
V+	1	■	■	2	V+
GND	3	■	■	4	Vcc
Res	5	■	■	6	Vcc
L60	7	■	■	8	Batt.
L61	9	■	■	10	AGND
L62	11	■	■	12	Aref
L63	13	■	■	14	AN 3
L64	15	■	■	16	AN 2
L65	17	■	■	18	AN 1
L66	19	■	■	20	AN 0
L67	21	■	■	22	Alarm
L70	23	■	■	24	Run/PC
L71	25	■	■	26	
L72	27	■	■	28	
L73	29	■	■	30	L37
L80	31	■	■	32	L36
L81	33	■	■	34	L35 / INE
L82	35	■	■	36	L34 / Dclk
L83	37	■	■	38	L33 / Aclk
L84	39	■	■	40	L95 / RTS0
L85	41	■	■	42	L94 / RxD1
L86	43	■	■	44	L93 / TxD1
L87	45	■	■	46	L92 / CTS0
RESET	47	■	■	48	L91 / RxD0
GND	49	■	■	50	L90 / TxD0

Extension Port Pinout

On the "Extension Port for general purpose" connector all pins of the Tiny Tiger module are available for your individual usage.

But please remember that several pins are already used for special functionality, like e.g. for the graphical LC display. So when you intend to use LC display, keys, LEDs or the encoder some or all of the appropriate Tiger pins L36, L37, L60...L67, L70...L73, L80...L85 and L87 are not available and shouldn't be connected here.

note: The Ethernet Prototyping Board is an open evaluation board without enclosure, and it is entendet for use by experienced technicans and engineers in electronic laboraties only.
Protect the board from electrostatic discharge. This equipment does not have adequate electromagnetic radiation shielding. Therefore, it is susceptible to the effects of external electromagnetic radiations and may generate electromagnetic radiation. Provide protection to other electronic equipment , to prevent errors on their operation or on operation of the Ethernet Prototyping Board.

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Select BAUD-Rate for communication between Tiger and EM01 with DIP1

3	2	1	
OFF	OFF	OFF	default
OFF	OFF	ON	1200
OFF	ON	OFF	2400
OFF	ON	ON	4800
ON	OFF	OFF	9600
ON	OFF	ON	19200
ON	ON	OFF	38400

U1 TIGER_T

TINY-Tiger

L60, L61, L62, L63, L64, L65, L66, L67, L70, L71, L72/PWM, L73/PWM, L80, L81, L82, L83, L84, L85, L86, L87, RESET, GND

L90/TxD0, L91/RxD0, L92/CTS0, L93/TxD1, L94/RxD1, L95/RTS0, L33, L34, L35, L36, L37, Alarm out, reserved, /PC, Analog in 0, Analog in 1, Analog in 2, Analog in 3, Analog GND, A/D-Ref in, Battery in, VCC

23 TxD0, 24 RxD0, 25 CTS0, 26 TxD1, 27 RxD1, 28 RTS0, 29 L33_Aclk, 30 L34_Dclk, 31 L35_/INE, 32 L36, 33 L37, 34 Alarm, 35 Res, 36 RUN_PC, 37 AN_0, 38 AN_1, 39 AN_2, 40 AN_3, 41 AGND, 42 A_REF, 43 Batt, 44

J5 / IDC50 — Extension Port

GND, V+, VCC, Res, L60, L61, L62, L63, L64, L65, L66, L67, L70, L71, L72, L73, L80, L81, L82, L83, L84, L85, L86, L87, RESET, GND

8 Batt, 10AGND, 12A_REF, 14AN_3, 16AN_2, 18AN_1, 20AN_0, 22Alarm, 24RUN_PC, 26, 28, 30L37, 32L36, 34L35_/INE, 36L34_Dclk, 38L33_Aclk, 40RTS0, 42RxD1, 44TxD1, 46CTS0, 48RxD0, 50TxD0
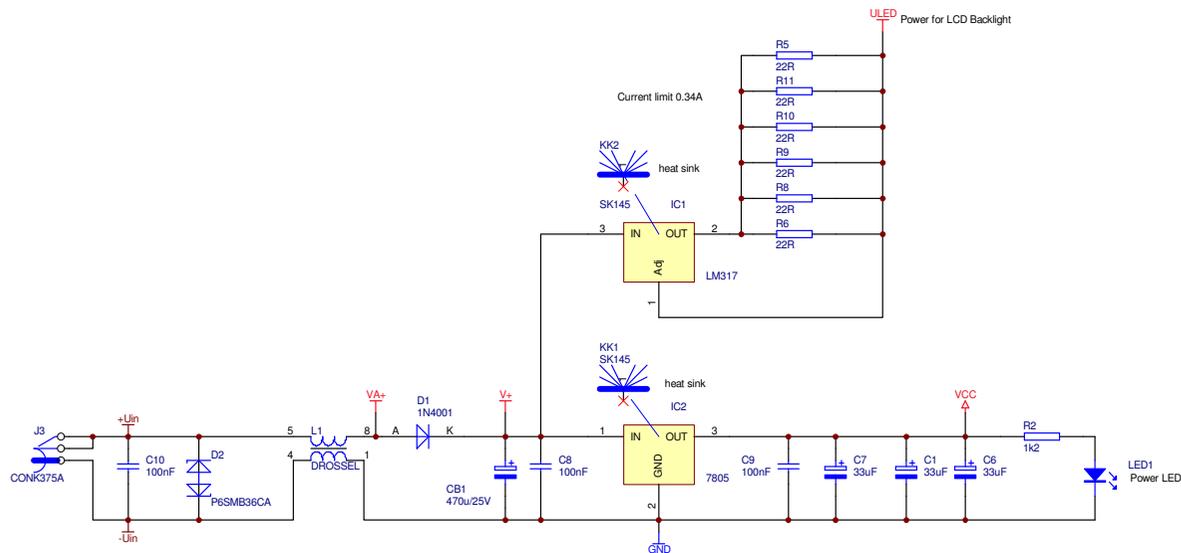
U3 EM_01_ETH

25 RxD_T, 26 TxD_T, 10 RTS_T, 9 CTS_T, 13 /RES, 6 BAUD0, 7 BAUD1, 8 BAUD2

RX_M 18, RX_P 17, TX_M 19, TX_P 20, /PG_EN 1, PG_CLK 2, PG_DIN 3, PG_DOUT 4

Reserved9, Reserved12, Reserved13, Reserved14, Reserved15, Reserved16, Reserved5, Reserved6, Reserved7, Reserved8

GND 14, VCC 28

Do not connect the reserved Pins / used for future updates

Ethernet-Connector J4 — LF1S028 RJ45

C13 100nF, C12 100nF, GND

J7 Wanne10pin

/PG_ENABLE, GND, PG_CLK, RESET_EM, PG_Din, PG_Dout

DIP1

R15 6k8, R14 6k8, R13 6k8, C11 100nF, GND

D3 1N4148, K, A, RESET_EM, R32 6k8, VCC, GND

T5 TASTB1720 RESET, GND

C15 100nF, GND, VCC

SW1 SW 1-UM PC, Mode, RUN, Mode Switch, R26 6k8, RUN_PC

MAX232 U2 — RS232 Driver and Receiver

VCC, 11 T1in, 10 T2in, 12 R1out, 9 R2out, T1out 14, T2out 7, R1in 13, R2in 8

C14 100nF, GND, VCC

C4 1u/16V, C1+, C1-, C2+, C2- , 1µF, C5 1u/16V, GND

V+ (1µF to VCC, + to IC), V- (1µF to GND, + to GND), C2 1u/16V, C3 1u/16V, VCC, GND, GND

J6 DB9-F SER1

connect to PC in PC-Mode, GND

Keys_and_Display

L36, L37, L60, L61, L62, L63, L64, L65, L66, L67, L70, L71, L72, L73, L87, L80, L81, L83, L84, L85, RESET

EPB_Display.sch

Power Supply EPB_Power.sch

Screws... X1, X2, X3, X4

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LC Display

LCD Contrast adjust

LCD Contrast adjust

Impulse Genaerator (Encoder)

J2 / Wanne20

Pin	Signal	Description
1	Vss	Power supply (GND)
2	Vdd	Power supply(+)
3	Vo	Contrast Adjust
4	C /D	Command /data select
5	/RD	Data read
6	/WR	Data write
7	D0	Data bus line
8	D1	Data bus line
9	D2	Data bus line
10	D3	Data bus line
11	D4	Data bus line
12	D5	Data bus line
13	D6	Data bus line
14	D7	Data bus line
15	/CE	Chip enable
16	/RST	Reset
17	Vee	Negative output
18	MD2	Select number of columns
19	FS1	Font selection
20	NC	No Connection

R18 100k, R20 100k, R1 50k, R17 1k2, VEE
contrast

R27 6k8, R24 6k8, R23 6k8
VCC

R34 100k
R7 100k, R4 6k8
R12 6k8, R3 100k
font_select, columns

PLS1 Out, PLS2, GNDGND
IG1 DIGISW_1

R40 6k8, D4 1N4148, D5 1N4148
RESET, L85, LCD_RST

R35 100k, R36 100k, R37 100k, R38 100k, R39 100k
L60, L61, L62, L63, L64
R16 6k8, R19 6k8, R21 6k8, R22 6k8, R28 6k8
T2, T3, T4, T6, T1

L72, L73, L87
L36, L37, L60, L61, L62, L63, L64, L65, L66, L67, L70, L71, L80, L81, L82, L83, L84, L85, RESET

ULED
J1 STIFTLEISTE3X1
Power LCD Backlight

LED2 ↑ R25 1k2
LED5 ↓ R31 1k2
LED3 ← R29 1k2
LED4 → R30 1k2
L36, L37, L70, L71

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ULED Power for LCD Backlight

R5 22R
R11 22R
R10 22R
R9 22R
R8 22R
R6 22R

Current limit 0.34A

KK2
SK145 heat sink
IC1
3 IN OUT 2
Adj
LM317
1

KK1
SK145 heat sink
IC2
1 IN OUT 3
GND
7805
2
GND

J3
CONK375A
+Uin
-Uin

C10 100nF

D2
P6SMB36CA

5 L1 8
4 DROSSEL 1

VA+

D1
1N4001
A K

V+

CB1
470u/25V

C8 100nF

C9 100nF

C7 33uF

C1 33uF

VCC

C6 33uF

R2 1k2

LED1
Power LED