

Ethernet Adapter EM01



Serial - V1.6 - V1.8

Technical Documentation

Ethernet for every embedded system

A small module makes it possible: the Ethernet Adapter EM01 connects microcomputers, single-chip processors and single-board computers simply with ethernet.

The native intelligence of the on-board processor handles all necessary operations and considerably reduces the load on the actual control. At last, a powerful ethernet utilisation in a microprocessor application is possible, which is also simple to integrate.

Easy to use program examples and Starter Kits - complete ready to go systems - mean a quick start and guarantee short development periods.

With its slight dimensions of 3.9 x 2.8 x 1.0 cm, weight of 19 grams and 28 pin Dip-type module-casing there is ample room for the adapter. The chip connects to a 5V DC energy source and its interface is compatible with 3V / 5V.

The ethernet adapter is available in two models: with a serial interface (1.200 to 38.400 Bd ASYNC) 3V / 5V gage (EM01) or with an 8-bit parallel interface (EM03).

The EM01 Ethernet Adapter connects to a 10 MBit Ethernet through a RJ45 connector with filter and is fully compatible to todays 10/100 MBit Ethernet networks.



Application Areas:

- ◆ Factory automatisation
- ◆ Data transfer via Ethernet
- ◆ Embedded Web Server or Client applications
- ◆ Connection to Internet via standard TCP/IP Router

Protocols:

The EM01 Ethernet adapter handles already locally these communication levels:

- ◆ ARP
- ◆ IP
- ◆ TCP
- ◆ DHCP
- ◆ DNS
- ◆ UDP
- ◆ SNTP

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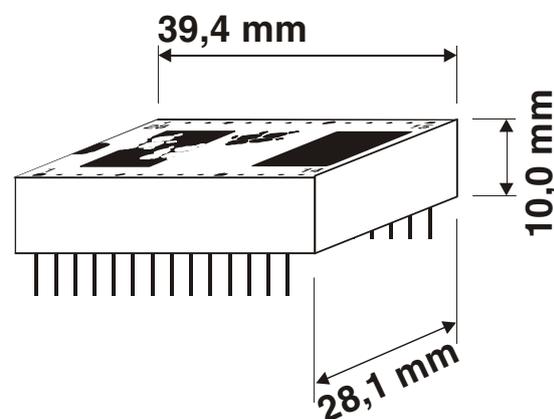
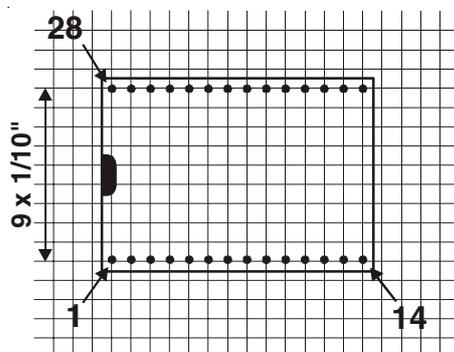
Pin-Definition

Name	Pin	Type	Description
VCC	28	PWR	+5V dc Supply
GND	14	PWR	0V Supply
/Reset	13	In	Reset Input low active
TxD	26	Out	CMOS 3,3V Serial Transmit Signal (Connect to Tiger)
RxD	25	In	CMOS 3,3V..5V Serial Receive Signal (Connect to Tiger)
RTS_T	10	Out	CMOS 3,3V Handshake (connect to Tiger)
CTS_T	9	In	CMOS 3,3V..5V Handshake (connect to Tiger)
BAUD0	6	IN	BAUD Rate select Bit0 (for communication with Tiger)
BAUD1	7	IN	BAUD Rate select Bit1 (for communication with Tiger)
BAUD2	8	IN	BAUD Rate select Bit2 (for communication with Tiger)
RX_P	17	In	Ethernet Receive Line - positive pole
RX_M	18	IN	Ethernet Receive Line - negative pole
TX_M	19	OUT	Ethernet Transmit Line - negative pole
TX_P	20	OUT	Ethernet Transmit Line - positive pole
/PG_EN	1	In	reserved for future updates
PG_CLK	2	In	reserved for future updates
PG_DIN	3	In	reserved for future updates
PG_DOUT	4	Out	reserved for future updates
DATA*	22	Out	output for data LED, high active
CONNECT*	23	Out	output for connect LED, high active

* Do not connect these pins at adapter versions 1.5 and older versions
The other pins are reserved for further functions. Do not connect the reserved pins

Case Dimension

ca. 39,4 x 28,1 x 10,0mm
ca. 19g
28-Pin



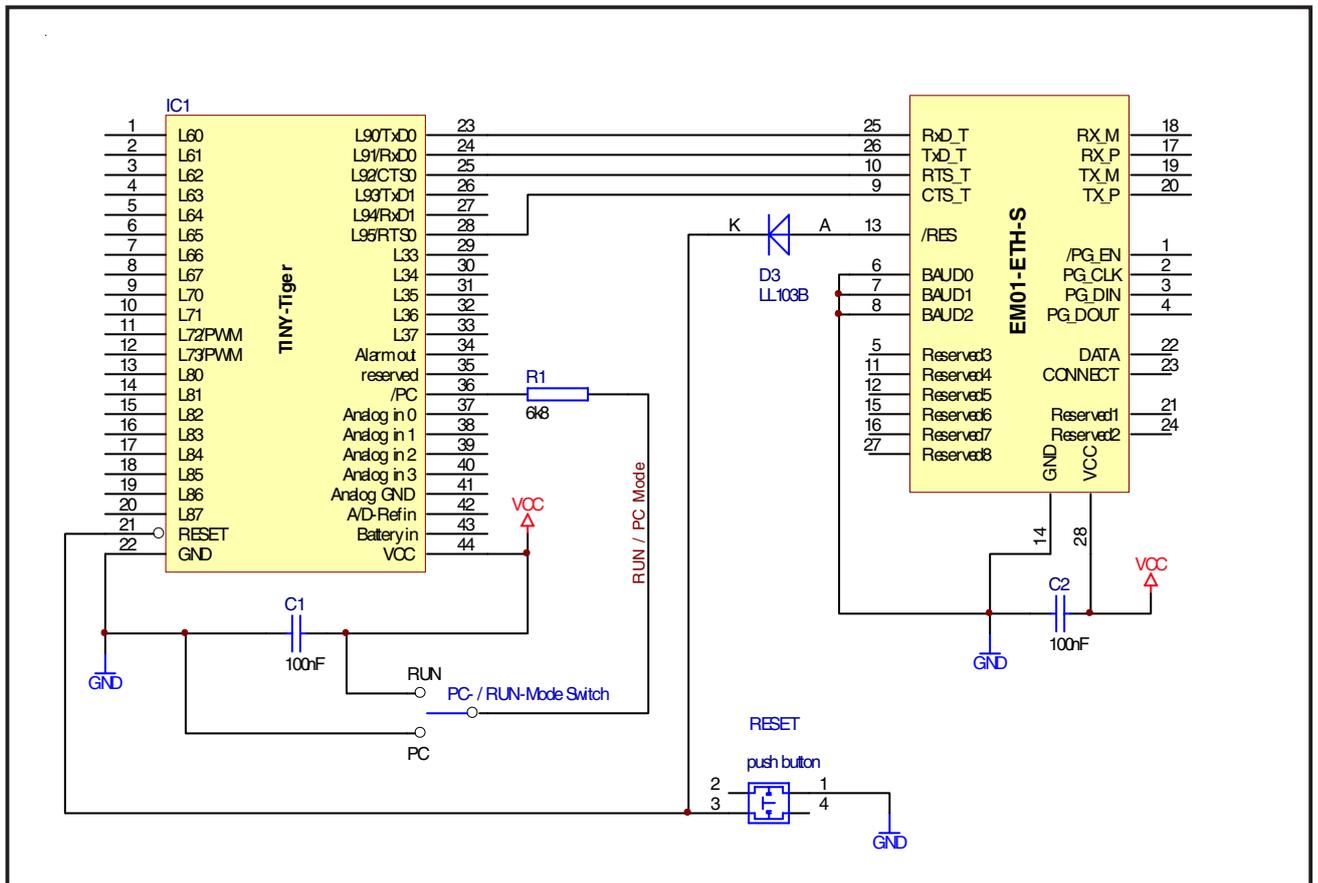
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Conection to Tiger

Connect the RxD_T signal of the EM01-ETH-S to the TxD0 pin of your BASIC-Tiger Computer, the TxD_T signal to the RxD0 Pin, the RTS_T signal to the CTS0 pin and the CTS_T signal to the RTS0 pin. The RESET pins should be tied together with a diode as shown in the figure below.

Only use 5V / 3V signal levels for serial interfacing.
Do not use RS232 voltage levels as used by AXN or AXI Tigers.



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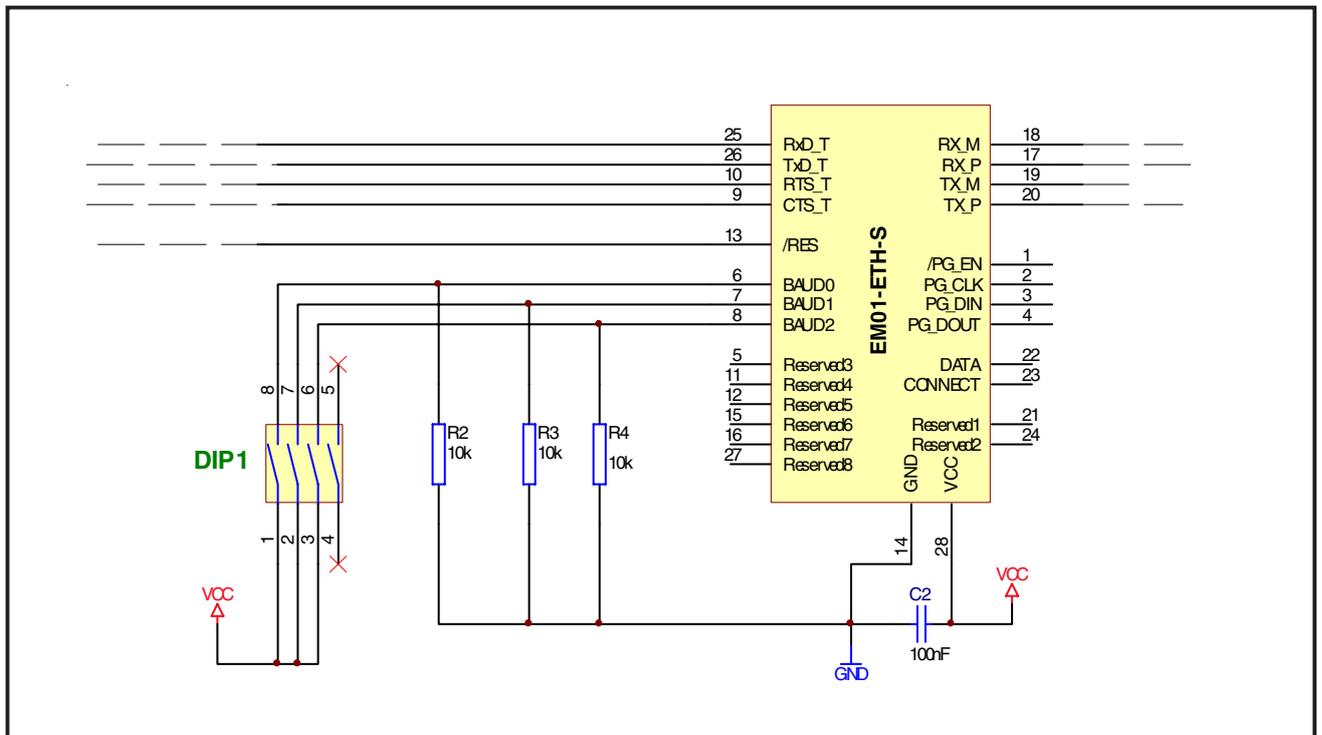
BAUD Rate select

To communicate with a BASIC-Tiger, select the same BAUD rate as you selected in your BASIC program. After Power-ON or RESET the EM01-ETH-S reads the signals BAUD0, BAUD1 and BAUD2. Connect them to GND to get the default BAUD rate 38400 bits/s. You can select other BAUD rates connecting at least one to logic high level:

BAUD2	BAUD1	BAUD0	BAUD-Rate
low	low	low	38.400 (default)
low	low	high	1.200
low	high	low	2.400
low	high	high	4.800
high	low	low	9.600
high	low	high	19.200
high	high	low	38.400

The interface parameters are: 8 Data Bit, No Parity, 1 Stop Bit.

To select the BAUD rate with DIP switches you may use following circuit diagram



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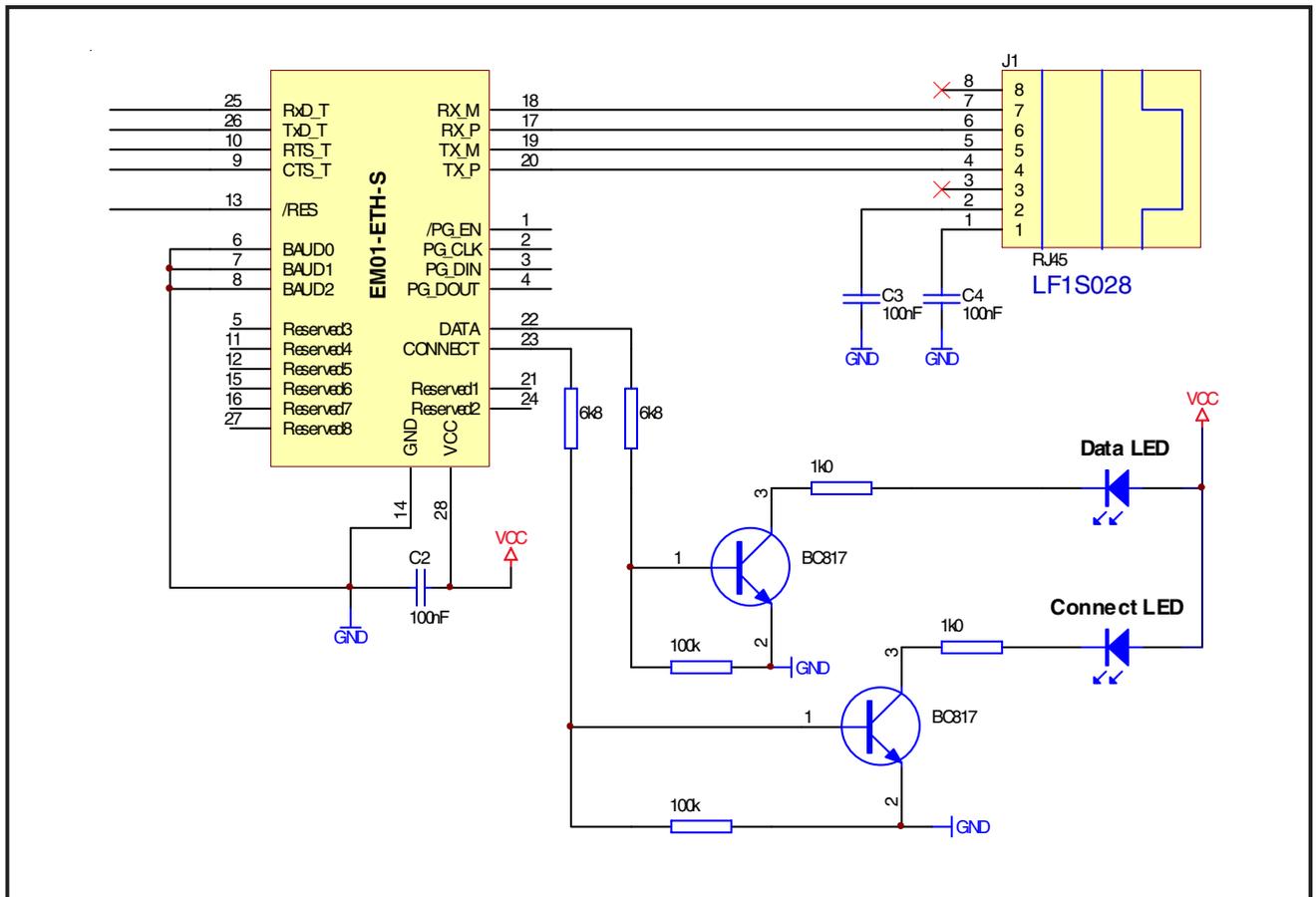
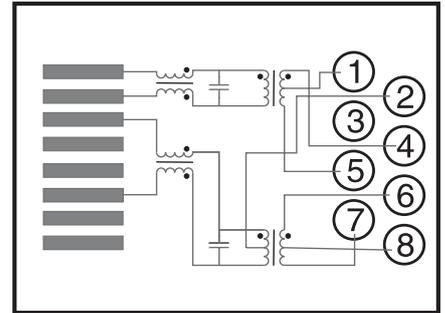


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Connection to Ethernet

To connect the EM03-ETH-P to the ethernet, use a connector with integrated 10 BASE T magnetics and filter like the connector LF1S028 from Bothhand. This part is used in Wilke products and is available as spare part through Wilke.

Alternatively you can use the HFJ11-S114E connector from HALO Electronics INC.



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Absolute maximum ratings (beyond which permanent damage may occur)

Supply Voltage VCC	5.5V
Input Voltage on any input pin	5.5V
Maximum Current per output pin	100mA
operating temperature	min. 0°C max. 50°C
Do not connect the reserved Pins	

DC Specifications

Parameter	Conditions	Value
Supply current		170mA
Input low voltage Input low voltage (/RESET)		1.0V max. 0.9V max.
Input high voltage Input high voltage (/RESET)		1.8V...5.5V 2.25V...5.5V
Output high current Output low current	Voh=2.4V Vol=0.4V	11mA (min.) 9mA
Input leakage current Input leakage current	logic value does change state logic value does not change	-80µA...80µA -1µA...1µA
Input leakage current for /RESET		-60µA...335µA

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Revision Table

Dokument	Adapter Version	Changes
V001	1.3	-
V002	1.3	Introduction added
V003	1.3	DC-Spcifications Supply Current added
V004	1.4	adapter revision: handshake signals added revision table added
V005	1.4	default BAUD rate corrected
V006	1.5	adapter revision: temperature performance improved pin-definition corrected
V007	1.5	some changes in the documentation layout done
V008	1.5	Connection to Ethernet, drawing with pin numbers added
V009	1.6	adapter revision: protocols UDP and SNTP added. ARP will start automatically after RESET. Output for data- and connect LED added
V010	1.6-1.8	Version numbers updated due to adapter revisions: V1.7 Software Update V1.8 Adapter is RoHS conform