

**Embedded 10Base-T Ethernet Controller Module with MAC and PHY and Ethernet Transformer.**

## AVAILABLE OPTIONS

Module Name	Ethernet Controller	Ethernet Interface	Components
ioMate-NET	Silicon Laboratories CP2201	<ul style="list-style-type: none"> <li>- IEEE 802.3 MAC and 10 Base-T PHY</li> <li>- compatible with 100/1000 Base T networks</li> <li>- full/half duplex with auto-negotiation</li> <li>- parallel 8-bit host interface (fast and only 11 IOs needed)</li> </ul>	<ul style="list-style-type: none"> <li>- Ethernet Controller</li> <li>- 3.3V LDO voltage regulator</li> <li>- 20MHz crystal</li> <li>- ethernet transformer</li> </ul>

## ETHERNET CONTROLLER

The ioMate.NET embedded ethernet module is based on Silicon Laboratories CP2201 ethernet controller with integrated MAC and PHY. The required 20MHz crystal is included on the module. The CP2201 is a 3.3V device, but provides 5.0 compatible IO signals. It can be directly connected to a 5V microcontroller without level shifters.

## HOST INTERFACE

The CP2201 ethernet controller provides a low pincount parallel bus interface with multiplexed data and address signals, chip select and read/write signals. It can be connected to an Intel or Motorola compatible bus interface (selectable by MOTEN signal) or can be driven by normal IO signals. So it can be connected to almost any micro controller through 11 normal IO signals. See [CP2201 data sheet](#) for details. The parallel host interface gives CP2201 based solutions a better network performance, than designs with a serial SPI or I2C interface ethernet controller.

## NETWORK INTERFACE

The ioMate.NET provides an onboard ethernet transformer, so just a normal RJ45 connector is required for ethernet connection. The module provides a footprint for a standard RJ45 connector. Alternatively the ethernet signals are available on the expansion connectors and can be connected to some other ethernet connector on a mother board.

## LINK LED

A combined ethernet link and activity LED can be assembled onboard. The LED is turned on when valid link pulses are detected and off if not. It is toggled for each packet transmitted or received for 50msec indicating link traffic.

## VOLTAGE REGULATOR

The 3.3V supply for the CP2201 is generated onboard by an ADP3331 LDO voltage regulator. The maximum supply voltage for the LDO is 12V, but it is recommended to power the module from a 5V supply to keep power dissipation low.

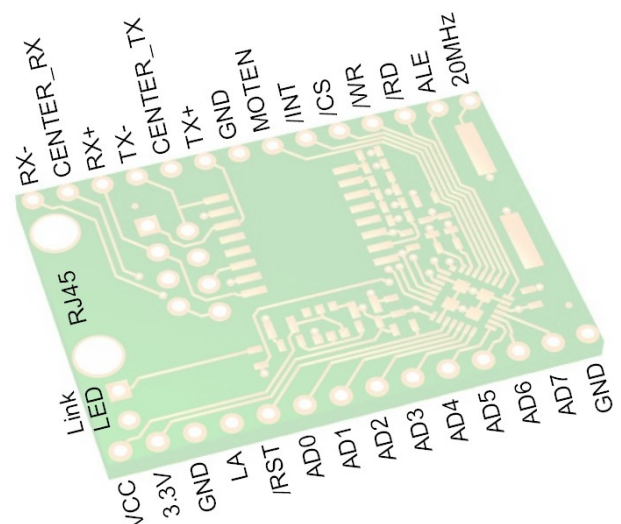
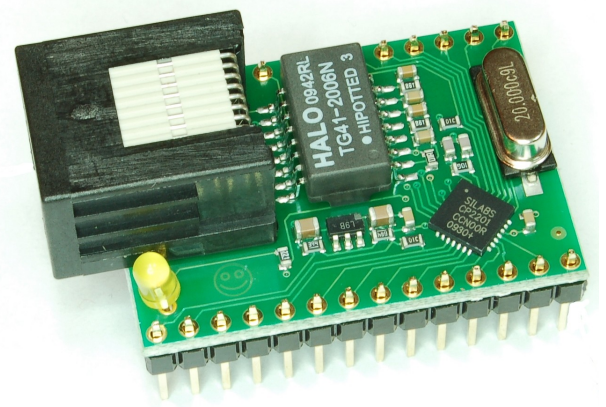
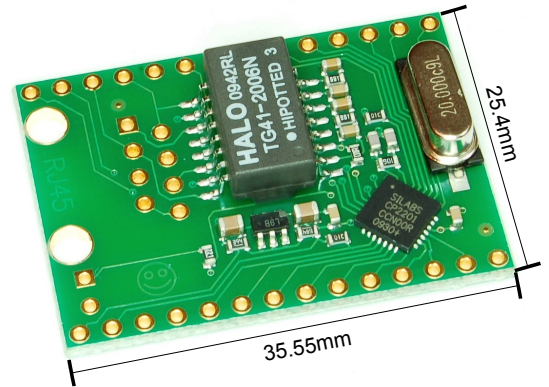
The 3.3V can also be used to power external circuitry additional to the module itself. The total current drawn from the regulator must be less than 200mA including the onboard components. See ADP3331 data sheet for maximum power consumption.

## EXPANSION CONNECTORS

All CP2201 signals as well as the ethernet signals and voltage regulator signals are available on two standard 2.54mm pitch connector rows.

## PINOUT

The picture right shows the pinout of the module. All pins are placed on a standard 2.54mm (1/10inch) grid.



## SCOPE OF DELIVERY

The ioMate.NET module comes without preassembled connectors to allow the customer to use any favorite connector type. A set of expansion connectors and receptacles, RJ45 connector and LED can be ordered optionally.

## OPERATING CHARACTERISTICS

Symbol	Parameter	Condition	Min	Typ	Max	Units
VCC	Input Voltage		3.5	5.0	12	V
3.3V	Onboard Regulated Voltage			3.3		V
Icc	Operating Current	Transmitting		75		mA
		No Network Traffic		60		mA
		Transmitter/Receive Disabled		47		mA
		Shutdown Mode		6.5		mA
T	Operating Temperature		-40		+85	°C

## DESIGN AND HANDLING GUIDELINES

This module – just like any other semiconductor devices – is susceptible to damage by ESD. Suitable precautions should be taken when handling and transporting devices. The possible damage to devices depends on the circumstances of the handling and transporting, and the nature of the device. The extent of damage can vary from immediate functional or parametric malfunction to degradation of function or performance in use over time. Devices suspected of being affected should be replaced.

## ETHERNET DRIVER AND TCP/IP STACK

Two ethernet drivers for the CP2201 for Atmel AVR controllers written in C (WinAVR), which can be easily ported to other microcontrollers, are available:

- A port of [Adam Dunkels uIP stack](#) at chip45 [Crumb644-NET](#) page.
- The Crumb IO firmware by Stefan Frings at [http://stefanfrings.de/avr\\_io/index.html](http://stefanfrings.de/avr_io/index.html). A very powerful and versatile embedded ethernet firmware. The page is in german, but the code is well commented in english.

## Declaration of Electro Magnetic Conformity of the CHIP45 „ioMate-NET V1.0“



CHIP45 embedded microcontroller modules (henceforce products) are designed for installation in electrical appliances or as dedicated evaluation boards (i.e.: for use as a test and prototype platform for hardware/software development) in laboratory environments.

### Caution:

CHIP45 products lacking protective enclosures are subject to damage by ESD and, hence, may only be unpacked, handled or operated in environments in which sufficient precautionary measures have been taken in respect to ESD-dangers. It is also necessary that only appropriately trained personnel (such as electricians, technicians and engineers) handle and/or operate these products. Moreover, CHIP45 products should not be operated without protection circuitry if connections to the product's pin header rows are longer than 3m.

CHIP45 products fulfill the norms of European Union's Directive for Electro Magnetic Conformity only in accordance to the descriptions and rules of usage indicated in this document (particularly in respect to the pin header row connectors, power connector and serial interface to a host-PC).

Implementation of CHIP45 products into target devices, as well as user modifications and extensions of CHIP45 products, is subject to renewed establishment of conformity to, and certification of, Electro Magnetic Directives. Users should ensure conformance following any modifications to the products as well as implementation of the products into target systems

## DISCLAIMER

In this manual are descriptions for copyrighted products that are not explicitly indicated as such. The absence of the trademark (™) and copyright (©) symbols does not imply that a product is not protected. Additionally, registered patents and trademarks are similarly not expressly indicated in this manual.

The information in this document has been carefully checked and is believed to be entirely reliable. However, chip45 GmbH & Co. KG assumes no responsibility for any inaccuracies. chip45 GmbH & Co. KG neither gives any guarantee nor accepts any liability whatsoever for consequential damages resulting from the use of this manual or its associated product. chip45 GmbH & Co. KG reserves the right to alter the information contained herein without prior notification and accepts no responsibility for any damages which might result.

Additionally, chip45 GmbH & Co. KG offers no guarantee nor accepts any liability for damages arising from the improper usage or improper installation of the hardware or software. chip45 GmbH & Co. KG further reserves the right to alter the layout and/or design of the hardware without prior notification and accepts no liability for doing so.

© Copyright 2010 chip45 GmbH & Co. KG, D-35440 Linden.

Rights - including those of translation, reprint, broadcast, photomechanical or similar reproduction and storage or processing in computer systems, in whole or in part - are reserved. No reproduction may occur without the express written consent from chip45 GmbH & Co. KG.

## CONTACT INFORMATION

Address:	chip45 GmbH & Co. KG Am Pfad 8 D-35440 Linden Germany
Ordering Information:	+49 (6403) 9253-53 <a href="mailto:info@chip45.com">info@chip45.com</a>
Technical Support:	+49 (6403) 9253-53 <a href="mailto:support@chip45.com">support@chip45.com</a>
Fax:	+49 (6403) 9253-50
Web Site:	<a href="http://www.chip45.com">http://www.chip45.com</a>