How to?
Adding Ethernet to your application/Device

Component Overview

Würth Elektronik –
more than you expect

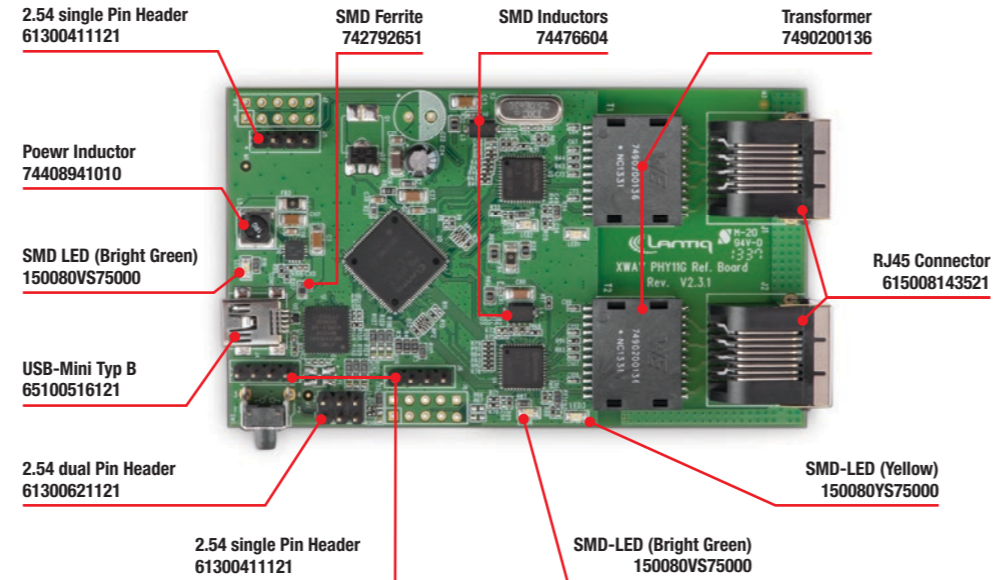**WÜRTH ELEKTRONIK**

■ **Check your existing appliccation (stove, coffee machine, Telephone, MP3-player, washing machine, …)**
  for an existing µC, if the interface
■ RMII / RGMII
■ SGMII
is already existing. If, …
a) no, there is no interface – please call us and we'll help you to get to b)
b) yes, now you are just a couple steps away from an ethernet capable device

e.g. COFFEE MACHINE	e.g. LAN section

Display

µC

RMII
RGMII
SGMII

?
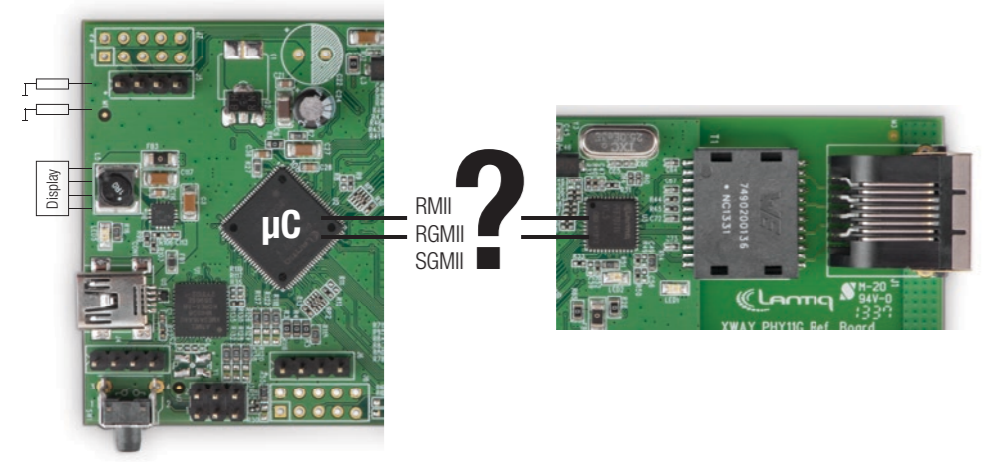
■ Download the application note & layout files from our website and implement the data into your existing PCB layout by
  connecting the interface with the µC.
■ We suggest to download the full Bill of Materials for proper funtion
■ Order samples especially of
  · Lantiq XWAY PHY11G
  · WE-LAN 7490200136 / WE-COM 615008143521 or WE-RJ45 7499111121A

2.54 single Pin Header
61300411121

SMD Ferrite
742792651

SMD Inductors
74476604

Transformer
7490200136

Poewr Inductor
74408941010

SMD LED (Bright Green)
150080VS75000

RJ45 Connector
615008143521

USB-Mini Typ B
65100516121

2.54 dual Pin Header
61300621121

SMD-LED (Yellow)
150080YS75000

2.54 single Pin Header
61300411121

SMD-LED (Bright Green)
150080VS75000

Additional ideas
■ Any service technician would love to
  check the device before physical local
  support is put in place (remote diagnosis)
■ Every end customer loves to be up to
  date with the newest features
 (software updates)
■ …

Why Ethernet?
■ It is a communication standard since
  more than 30 years
■ It is a robust technology
■ Easy to implement
■ No specific driver
■ All components are standard components
■ Agnostic interface

REPEATER FUNCTION
Use the demoboard to extend your LAN to 200 m.

More of our smallest inductors:
■ WE-TPC SMD Shielded Tiny Power Inductors
■ WE-LQ SMD Inductor
■ WE-MAPI SMD Power Inductor
■ WE-PMI Power Multilayer Inductor
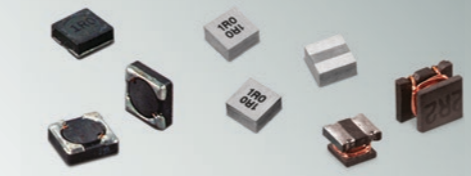
More of optoelectronics:
■ WL-TMRW THT LED round
■ WL-SMSW SMD chip LED side view mono-color waterclear
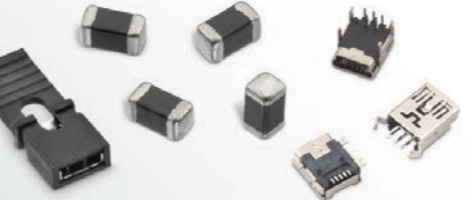■ WL-SMRW SMD chip LED reverse mount mono-color waterclear

More RJ45 integrated & discrete LAN:
■ WE-LAN LAN-Transformer
■ WE-RJ45 LAN Transformer

**More chip bead ferrites:**
■ WE-CBF Chip Bead Ferrites

More connectors:
■ WERI Connectors

**Würth Elektronik offers more complete solutions, such as sample kits
with continuous free re-fills, EMC lab support, seminars, technical design books
and much more!**

Want more info about your kit? Please visit www.we-online.com/ethernet

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Highspeed Connected to the World
Ethernet Demonstration Board

µC	XWAY PHY11G	WE-Magnetics
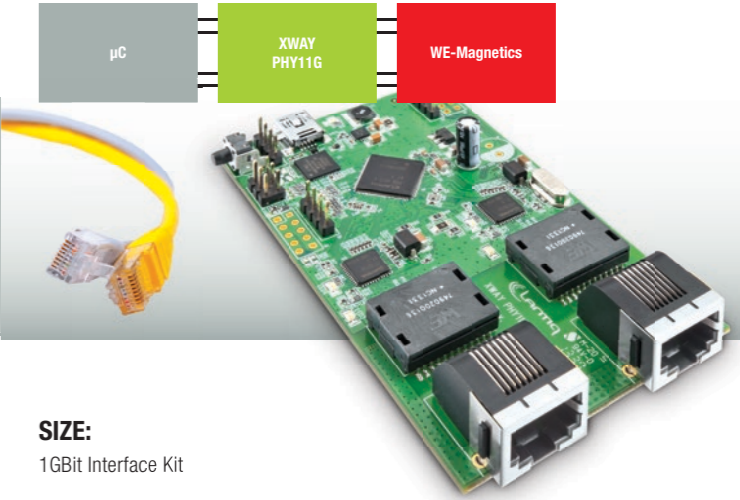
**Order Code 749 020
Version 1.0**

SIZE:
1GBit Interface Kit

TECHNICAL DATA:
■ 10 / 100 / 1000 Mbps (half & full duplex)
■ Energy Efficient Ethernet (IEEE 802.3az)
■ ultra low power consumption (50 mW*)
■ 'Wake on LAN' / auto power-down modes
■ Integrated DC / DC converter

* LAN not connected, Watch-Modus

Lantiq

**2 components to make your device
ethernet capable**

Quick Start Guide Hardware

Quick Start Guide – Test procedure 1
Existing Hardware & Windows Task Manager

Quick Start Guide - Test procedure 2
Separate Software „iperf"

Quick Start Guide - Test procedure 2
Separate Software „iperf"

To use your 1Gbps demoboard, please,

- Download the software XXXXXX from our website to be able to track the Ethernet traffic (you can also use other freeware available)
- Make sure your computer is connected to a 1Gbps Ethernet Switch and you are connected to a server or 2nd computer being 1Gbps Ethernet capable

1) without the demonstration board

- Copy a file via your LAN network and monitor the data traffic with the software (make sure, that your LAN traffic is through the local switch only and no WAN connection is setup) → analyze the traffic as described on next page
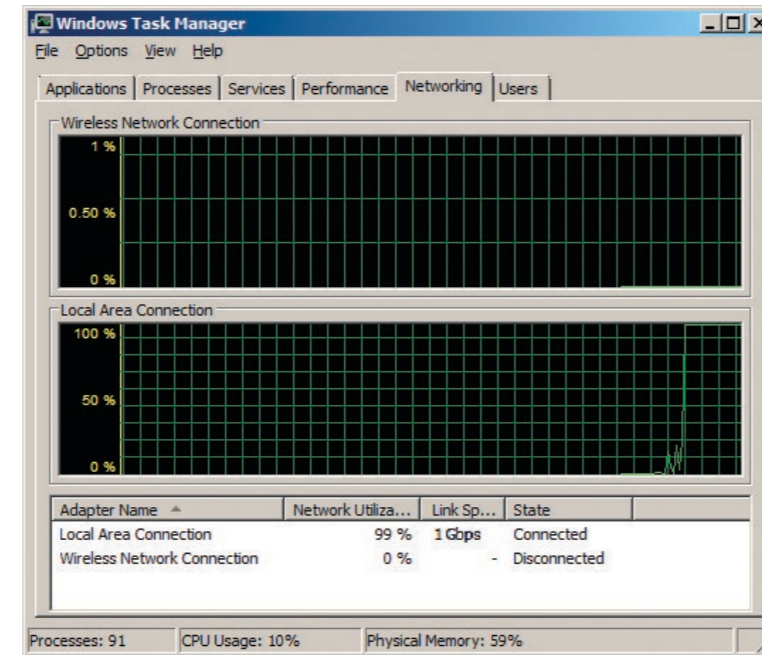
2) To be able to see the real 1Gbps traffic with the demoboard, please

- Disconnect the LAN cable from your computer, plug it into one of the RJ45 connectors of the demoboard.
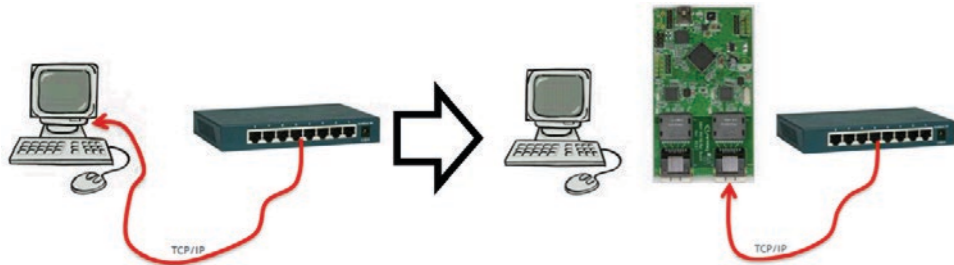
- Take the RJ45-cable and USB-cable out of the box and connect your computer with the demoboard

- Copy a file via your LAN network and monitor the data traffic with the software (make sure, that your LAN traffic is through the local switch only and no WAN connection is setup) → analyze the traffic as described on next page
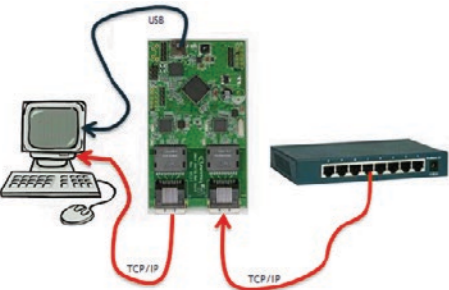
More information on www.we-online.com/ethernet


Windows Task Manager

A) Read the Network Utilization at the computer before connecting the demonstration board
B) Read the Network Utilization at the computer why having the demonstration board connected
→ The Network Utilization should be approximately the same for both test setups
→ Feel free to perform a second test with Test procedure 2 (next page)

REPEATER FUNCTION
Use the demoboard to extend your LAN to 200 m.

Requirements:

- Two Personal Computers/Laptops PC1 and PC2 each equipped with a Gigabit Interface and running Windows XP or 7.
- Two Ethernet cables (CAT5e) which supports speed up to 1 Gbps.
- Demonstration board XWAY OHY11G (Device under test DUT)
- USB cable
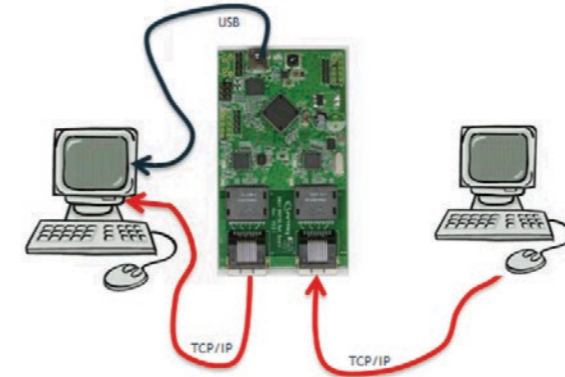
Configuration:
Let us configure PC1 as Server and PC2 as Client.
- Set PC1 (Server) to be 192.168.1.20.
- Set PC2 (Client) to be 192.168.1.10.
The demonstration board connects PC1 and PC2 with the Ethernet cables as shown below.

Test:

01. Copy and unzip iperf to "C:\" PC1 (Server) and PC2 (Client).
02. Open "Command Prompt cmd" on PC1 (Server) and PC2 (Client)
03. Press Windows start button and enter "cmd" into the Run-field
04. Go to "C:\iperf" on PC1 (Server) and PC2 (Client).
05. Run iperf_server.bat on PC1 (Server).
06. Open Windows Task Manager by "CTRL+ALT+DEL" and navigate to Networking Tab
    a) Click View → Select Columns
    b) Select Bytes Throughput and Click Ok.

07. Keep the windows open
08. Run iperf_client.bat on PC2 (Client).
09. Read the Network Utilization and Bytes throughput at the PC1 (Expected utilization rate should be around 95 %).
10. Close the script by issuing "Ctrl+C" on PC1
11. Close the script by issuing "Ctrl+C" on PC2

SERVER (192.168.2.20)

SERVER (192.168.2.20)

SERVER (192.168.2.20)