



# WL-COMETH WL-DONGLE USER GUIDE



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# I INTRODUCTION

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## I.1 Purpose of this manual

This manual may not be up to date. Please download the latest documentation on our web site ([www.acksys.fr](http://www.acksys.fr))

This manual provides instructions to easily install and configure the WL-COMETH product on your network.

Chapter II “Package checklist” allows you to check if your package was complete when delivered.

Chapter III “Product specifications” describes the fundamental possibilities of the product.

Chapter IV “WIFI network topology” describes the difference between AD-HOC and INFRASTRUCTURE WIFI topology.

Chapter V “Connectors” describes the serial connectors of the WL-COMETH.

Chapter VI “Cabling recommendations” gives some background required to install the WL-COMETH.

Chapter VII “Getting started” is a step-by-step description of a typical WL-COMETH installation in a simple application context.

Chapter VIII “Troubleshooting” gives hints on what to do when the installation fails.

Chapter IX “Advanced configuration” describes all the configuration parameters you can use, and how to use them.

Chapter X “Addressing in Network protocols” gives some background in networking, required to install the COMETH.

It is expected that the reader of this manual has some background knowledge of TCP/IP and how to setup and use TCP/IP on a Windows-based PC. As well, anyone installing a COMETH should know how his/her network is organized.

## I.2 The Ethernet to serial converters range

The WL-COMETH is part of our WIFI products range, which includes the WL-ACCESS (a WIFI access point for Ethernet) and the WL-BRIDGE (a Ethernet to Ethernet WIFI bridge).

The WL-COMETH range is further extended with the COMETH range which offers different products, each designed for a specific market and needs.

### COMETH:

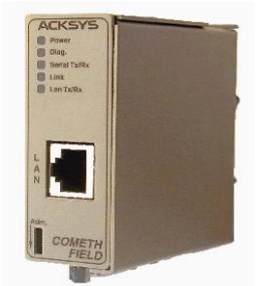


The simplest device of the range, designed for most common RS232 serial device.

Metal housing, Dongle DB9 XX small, RS232, 10 BASE-T LAN interface, external power supply with jack connector.

Option available on request for quantity only : Power over serial, without metal housing.

### COMETH-FIELD:



The COMETH-FIELD range is specifically designed for IA market.

Metal housing, Din Rail mounting, RS232/RS422/RS485 serial interface, 10 BASE-T LAN interface, DC power from 9 to 36 VDC.

Option available on request for quantity only : Isolated 9 to 36 VDC or 18 to 72 VDC, 10 BASE-T LAN interface.

### COMETH-EMBD:



The COMETH-EMBD range is specifically designed for OEM market and used as a component to integrate into an electronic design.

TTL serial interface, 10 BASE-T LAN interface available with its transformer, RJ45 connector and 3 LEDs mounted or without its transformer and RJ45 connector or with transformer and additional connector in separate package.

### I.3 The WIFI to serial converters range



#### **WL-COMETH version I:**

The WL-COMETH is specifically designed for connecting RS232/422/485 equipment with the network, when you can't plug Ethernet wire (moving device).

Metal housing, RS232/RS422/RS485 serial interface, WIFI 802.11b interface, DC power from 9 to 36 VDC or AC power from 85 to 264 VAC.



#### **WL-COMETH version II:**

The WL-COMETH is specifically designed for connecting RS232/422/485 equipment with the network, when you can't plug Ethernet wire (moving device).

Metal housing, RS232/RS422/RS485 serial interface, WIFI 802.11b interface, DC power from 9 to 36 VDC or AC power from 85 to 264 VAC.



#### **WL-COMETH version II Weather Proof:**

The WL-COMETH-WP is specifically designed for connecting RS232/422/485 equipment with the network, when you can't plug Ethernet wire (moving device).

Plastic housing, IP65, RS232/RS422/RS485 serial interface, WIFI 802.11b interface, DC power from 9 to 36 VDC or AC power from 85 to 264 VAC.



#### **WL-DONGLE:**

The WL-DONGLE is specifically designed for connecting RS232 equipment with the network, when you can't plug Ethernet wire (moving device). Device is very compact and is specially designed to satisfy the needs of the system integrator market

Metal housing RS232 serial interface, WIFI 802.11b interface, DC power 5 V through external power supply.

## **I.4 Application software**

The WL-COMETH version I FLASH EPROM can contain up to six different firmwares, including client and server software, tunnelling, modbus support, etc. New firmwares can be developed by ACKSYS to meet specific needs. To list all firmwares flashed in the WL-COMETH FLASH EPROM, a dedicated administration command (show prog list) can be run (see chapter “[Commands list](#)”).

See [download firmware user guide\(DTUS040\).pdf](#) documentation to understand in details the software architecture.

The WL-COMETH version II and the WL-DONGLE FLASH EPROM can contain 1 firmware. If this software is not appropriate for your use, you can download in WL-COMETH version II a TCP CLIENT firmware, MODBUS gateway... See on the ACKSYS CD-ROM or the ACKSYS web site ([www.acksys.fr](http://www.acksys.fr)) to see all the firmwares available on WL-COMETH version II and WL-DONGLE.

## **I.5 Administration software**

All the embedded firmwares have an administration system relying on a Command Line Interpreter. The administration system is accessible through the serial port as well as through the network.

Administration commands common to all firmwares are documented in chapter “[Commands list](#)”.

The commands specific to other firmwares (SERVERCOM, MODBUS TCP, MULTIPOINT, TCPCLIENT...) are documented in a dedicated manual (See the ACKSYS CDROM or the ACKSYS web site: <http://www.acksys.fr>)

## **I.6 Default software**

Upon delivery, the default firmware enabled is “SERVERCOM”, which enables two main functionalities :

- TCP server: To use WL-COMETH in raw mode with a network (socket) application
- Telnet RFC2217: To use WL-COMETH with a com application (needs a COM port redirector like VIP)

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## II PACKAGE CHECKLIST

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The **WL-COMETH** package contains the following components :

- One WL-COMETH device
- One DB9 male screw terminal (Only in WL-COMETH version I package)
- One DB9 female to DB9 female null modem cable
- One main supply cable
- WL-COMETH “quick start” guide
- ACKSYS CD-ROM

The **WL-DONGLE** package contains the following components :

- One WL-DONGLE device
- One DB9 female to DB9 female null modem cable
- WL-DONGLE “quick start” guide
- ACKSYS CD-ROM

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## III WL-COMETH PRODUCT SPECIFICATIONS

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### III.1 WL-COMETH version I characteristics

RS232 or RS422A/RS485 to WLAN.

Metal housing including :

DB9 male connector on the RS232 side

DB9 female on the RS422A/RS485,

WIFI interface (802.11b) at 11 Mbit/s.

RS232, RS422A/RS485 Master or Slave selection by software (built-in automatic turn-around in RS422A and RS485 mode)

External power supply 9 to 36 VDC for WL-COMETH-DC

Main power supply 85 to 246 VAC for WL-COMETH

Power supply protection by current limitation

RS422A/RS485 protection against temporary line voltage surges by peaks, breakdown voltage +/-6.5V in common and differential mode, capacitance 0.3 kW over 8/20  $\mu$ s

RS232/ RS422/ RS485 15 kV ESD protection

### III.2 WL-COMETH version II characteristics

RS232 or RS422A/RS485 to WLAN.

Metal or plastic (Weather proof version) housing including :

DB9 male connector on the RS232, RS485/422 side

WIFI interface (802.11b) at 11 Mbit/s.

RS232, RS422A/RS485 Master or Slave selection by software (built-in automatic turn-around in RS422A and RS485 mode)

External power supply 9 to 36 VDC for WL-COMETH-DC

Main power supply 85 to 246 VAC for WL-COMETH

Power supply protection by current limitation

RS422A/RS485 protection against temporary line voltage surges by peaks, breakdown voltage +/-6.5V in common and differential mode, capacitance 0.3 kW over 8/20  $\mu$ s

RS232/ RS422/ RS485 15 kV ESD protection

### III.3 DC Power

External power 9 to 36 VDC

DC POWER via 3 pins screw terminal connector

Maximum current 300 mA at 9 VDC

Power consumption : 3W max

### III.4 AC power

Main power 85 to 246 VAC, 47-440 Hz, 3W max

### **III.5 WLAN interface**

WIFI 802.11b interface, Ethernet speed 1,2,5.5,11 Mbps  
300 m (984 ft) nominal range (open space) from access point, 60 m (200 ft) in other cases.  
4 WEP keys 64/128 bits.  
IP Protocols: IPv4, ICMP, DHCP, TCP, Telnet, RFC 2217.  
Two TCP ports: port 23 for TELNET administration, one UDP port (port 68) when DHCP is used, other TCP and UDP ports available and configurable for data exchange

### **III.6 Serial interface**

The type of serial interface is selectable through the administration system. You can use RS232 or RS422A/RS485 but not both simultaneously.

#### **III.6.1 RS232**

Full RS232 EIA/TIA 574 Serial interface  
DB9 male connector with DTE pinout  
Control signals: TxD, RxD, RTS, DTR, CTS, DSR, DCD and RI signals  
Maximum RS232 distance : 15 m (50 ft).  
Speed: 10 to 230400 bps  
Parity: none, even, odd, space or mark, 7 or 8 data bits, 1 stop bit.

#### **III.6.2 RS422A/RS485**

EIA RS422A/RS485 – CCITTV11 Serial interface  
DB9 female connector (WL-COMETH version I)  
DB9 male connector (WL-COMETH version II)  
Control signals: TxD, RxD  
Built-in automatic turn-around  
Line polarization selection by strap (WL-COMETH version I)  
Terminating resistor selection by jumper  
Maximum load in RS422A : 10 receivers  
Maximum load in RS485 : 32 receivers  
Maximum transmission distance : 1200 m (4000 ft) at 115200 bps  
Speed: 10 to 230400 bps  
Parity: none, even, odd, space or mark  
Data : 7 or 8 bits – 1 stop bit

### **III.7 Led indicators**

LED indicators :

- Power
- Diagnostic / general-purpose mode / error detection / reboot indicator
- Asynchronous interface Rx/Tx activity
- WLAN interface Rx/Tx activity
- RF signal quality on WLAN interface
- Serial Interface enabled (Only in WL-COMETH version II)

### III.8 Switches

WL-COMETH version I and II

- One switch allows selection between the two asynchronous serial interface modes (Administration / Data).

WL-COMETH version II

- Two switches for polarization resistor.
- One switch for terminating resistor.

### III.9 Environmental limitations

Operating temperature: 0°C to 65°C (32 to 149 °F).

Storage temperature: -40°C to +85°C (-40 to +185 °F).

Humidity: 0-95% RH (without condensation)

### III.10 Mechanical characteristics

WL-COMETH version I

Metal housing

Size: 17×15×4,2 cm (6.7×6×1.6 in) (antenna plugs not included, fastening included)

Weight : 0.700 Kg (1.54 lbs)

WL-COMETH version II

Metal housing

Size: 10×17×4 cm (4×6.7×1.6 in) (antenna plugs not included, fastening included)

Weight : 0.450 Kg (0.99 lbs)

WL-COMETH version II, weather proof version

Plastic housing

Size: 11,6×16,4×36 (4.6×6×13 in) (antenna plugs not included, fastening included)

Weight : 0.350 Kg (0.77 lbs)

Two omni-directional antennas, 2dBi. You can replace them by an antenna with more gain, through the external antenna (RSMA) connector.

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## **IV WL-DONGLE PRODUCT SPECIFICATIONS**

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### **IV.1 WL-DONGLE characteristics**

RS232 to WLAN.  
Metal housing including :  
WIFI interface (802.11b) at 11 Mbit/s.  
External power supply 5 VDC  
RS232 15 kV ESD protection

### **IV.2 DC Power**

External power 5 VDC  
Power consumption : 3W max

### **IV.3 WLAN interface**

WIFI 802.11b interface, Ethernet speed 1, 2, 5.5, 11 Mbps  
300 m (984 ft) nominal range (open space) from access point, 60 m (200 ft) in other cases.  
4 WEP keys 64/128 bits.  
IP Protocols: IPv4, ICMP, DHCP, TCP, Telnet, RFC 2217.  
Two TCP ports: port 23 for TELNET administration, one UDP port (port 68) when DHCP is used, other TCP and UDP ports available and configurable for data exchange

### **IV.4 RS232**

Full RS232 EIA/TIA 574 Serial interface  
DB9 male connector with DTE pinout  
Control signals: TxD, RxD, RTS, DTR, CTS, DSR, DCD and RI signals  
Maximum RS232 distance : 15 m (50 ft).  
Speed: 10 to 230400 bps  
Parity: none, even, odd, space or mark, 7 or 8 data bits, 1 stop bit.

### **IV.5 Led indicators**

LED indicators :  
Diagnostic / general-purpose mode / error detection / reboot indicator  
Asynchronous interface Rx/Tx activity  
WLAN interface Rx/Tx activity

### **IV.6 Switches**

One switch allows selection between the two asynchronous serial interface modes (Administration / Data).

#### **IV.7 Environmental limitations**

Operating temperature: -10°C to 60°C (14 to 140 °F).  
Storage temperature: -40°C to +85°C (-40 to +185 °F).  
Humidity: 0-95% RH (without condensation)

#### **IV.8 Mechanical characteristics**

Metal housing  
Size: 7.9×5.8×2.3 cm (3×2.2×0.8 in) (antenna plugs not included)  
Weigth : 0.110 Kg (0.24 lbs)

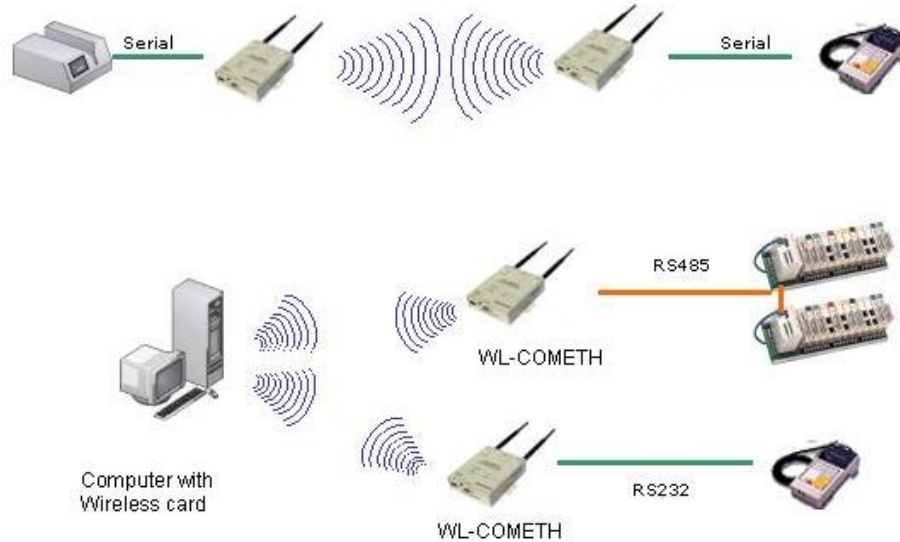
One omni-directional antenna. You can replace them by an antenna with more gain, through the external antenna (RSMA) connector.

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## V WIFI NETWORK TOPOLOGY

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### V.1 AD-HOC network



In AD-HOC mode, the WL-COMETH can establish direct communication with another WIFI equipment. This equipment can be another WL-COMETH or any WIFI-enabled device. In this mode, WL-COMETH cannot communicate with a wired Ethernet interface equipment.

If you use the AD-HOC mode to make a connection between two modbus RTU networks, use the MODBUS firmware on both sides and configure one of them in client mode, and the other in master mode.

If you use AD-HOC mode, use the TCPCLIENT firmware on one of the two WL-COMETH, and use the SERVERCOM firmware on the other.

### V.2 Infrastructure network



In infrastructure mode, you must have an access point (AP). In this mode the WL-COMETH can communicate with all the devices on your WIFI network through the AP, as well as with all the devices on the Ethernet.

In the default configuration, the WL-COMETH uses infrastructure and tries to connect to an access point with the SSID "acksys".

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## VI CONNECTORS

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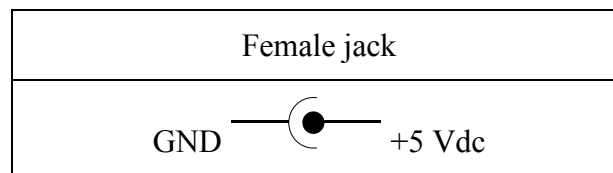
### VI.1 POWER connector cabling

#### VI.1.1 WL-COMETH-DC power connector

This connector is valid only on WL-COMETH-DC (DC version of WL-COMETH version I and version II)

Screw terminal connector (3 pins)		
PIN	Signal name	Description
1	GND	Protective ground
2	+VDC	Positive power supply
3	EARTH	Ground power supply

#### VI.1.2 WL-DONGLE power connector



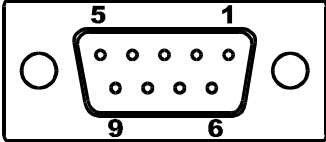
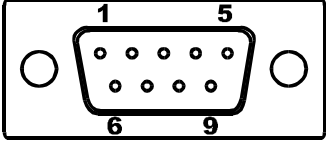
### VI.2 RS232 connector cabling

It is the same description for WL-COMETH version I, WL-COMETH version II and WL-DONGLE.

DB9 male with DTE cabling		
PIN	Signal name	Direction
1	DCD	Input (to WL-COMETH)
2	RxD	Input (to WL-COMETH)
3	TxD	Output (from WL-COMETH)
4	DTR	Output (from WL-COMETH)
5	GND	Digital ground
6	DSR	Input (to WL-COMETH)
7	RTS	Output (from WL-COMETH)
8	CTS	Input (to WL-COMETH)
9	RI	Input (to WL-COMETH)

### VI.3 RS422A/RS485 connector cabling

This connector is not present on WL-DONGLE.

	DB9 female WL-COMETH version I		DB9 male WL-COMETH version II	
				
Pin	RS422A	RS485	RS422A	RS485
1	Connect together for line polarization		Reserved	Reserved
2			Reserved	Reserved
3	B	Unused	B	Reserved
4	B'	BB'	B'	BB'
5	Digital ground		Digital ground	
6	Connect together for line polarization		Reserved	Reserved
7			Reserved	Reserved
8	A	Unused	A	Reserved
9	A'	AA'	A'	AA'

For WL-COMETH version I

**Terminating resistor enable**

Connect the jumper to ON position

**Terminating resistor disable**

Connect the jumper to OFF position or leave unconnected

For WL-COMETH version II

**Terminating resistor enable**

push switch in on position

**Terminating resistor disable**

push switch in off position

**Polarisation resistor enable**

push switch in on position

**Polarisation resistor disable**

push switch in off position

---

## VII CABLING RECOMMENDATIONS

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### VII.1 RS232 cabling recommendations

In RS232 mode, the 9-pins male connector is a standard (EIA/TIA574) Data Terminal Equipment (DTE) connector.

To connect WL-COMETH to a DTE peripheral, use a crossover (null-modem) cable.

To connect WL-COMETH to a DCE peripheral (for example a modem), use a straight cable.

### VII.2 RS422A/RS485 cabling recommendations

#### **Software configuration:**

Check section XI “**Advanced configuration**” to select your electrical interface.

#### **In RS422A mode:**

Identify A, A', B & B' signals on the equipment side.

Endpoints A, B, A' and B' are as defined in the EIA-422 and V11 recommendations, such that:  $V_A < V_B$  and  $V_{A'} < V_{B'}$  when idle, state also called MARK or OFF (Transmission/Reception of stop bits).

Connect signal A of the WL-COMETH to signal A' of the equipment.

Connect signal B of the WL-COMETH to signal B' of the equipment.

Connect signal A' of the WL-COMETH to signal A of the equipment.

Connect signal B' of the WL-COMETH to signal B of the equipment.

**In RS485 mode :**

Identify AA' & BB' signals on the equipment side

Endpoints AA' and BB' are as defined in the EIA-485 and V11 recommendations, such that:  $V_{AA'} < V_{BB'}$  when idle, state also called MARK or OFF (Transmission/Reception of stop bits).

Connect signal AA' of the WL-COMETH to signal AA' of the equipment.

Connect signal BB' of the WL-COMETH to signal BB' of the equipment.

**Line polarization**

Line polarization is needed for stability in RS485 mode and RS422A mode in multidrop Master / Slave set-up (also called RS485 4 wires).

Line polarization is integrated to the WL-COMETH.

In WL-COMETH version I, can be connected by cabling 2 straps on the DB9 female connector.

In WL-COMETH version II, can be connected by pushing the corresponding switch to on position.

A single polarization is necessary on the bus.

**Terminating resistor :**

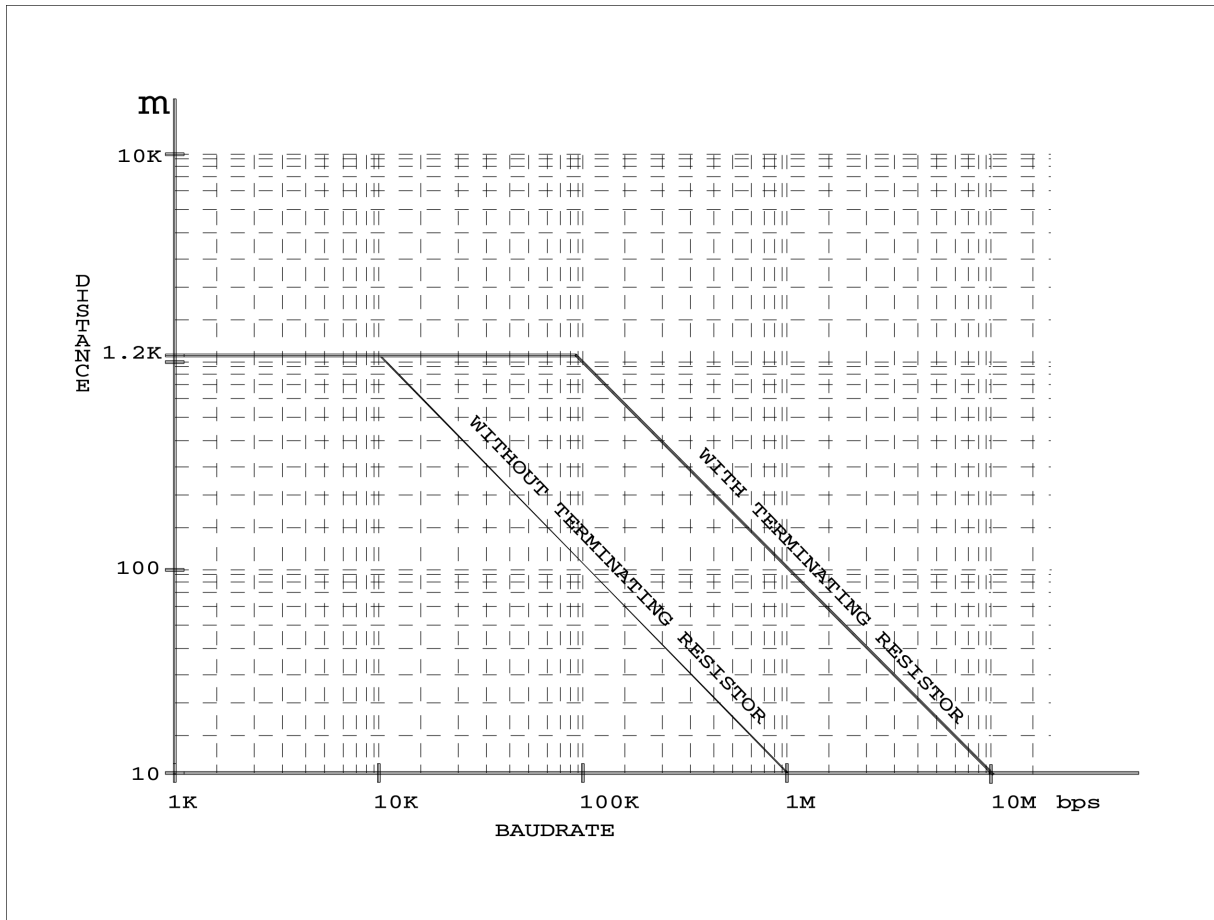
The terminating resistor for RS422A/RS485 line reduces signal reflections created by long lines at high speeds. It is not required in noise-free environment and if the distance and the rate are within 1000 meters at 9600 bps or 100 meters at 115200 bps.

A terminating resistor is integrated to the WL-COMETH.

In WL-COMETH version I, be connected by a jumper.

In WL-COMETH version II, can be connected by pushing the corresponding switch to on position.

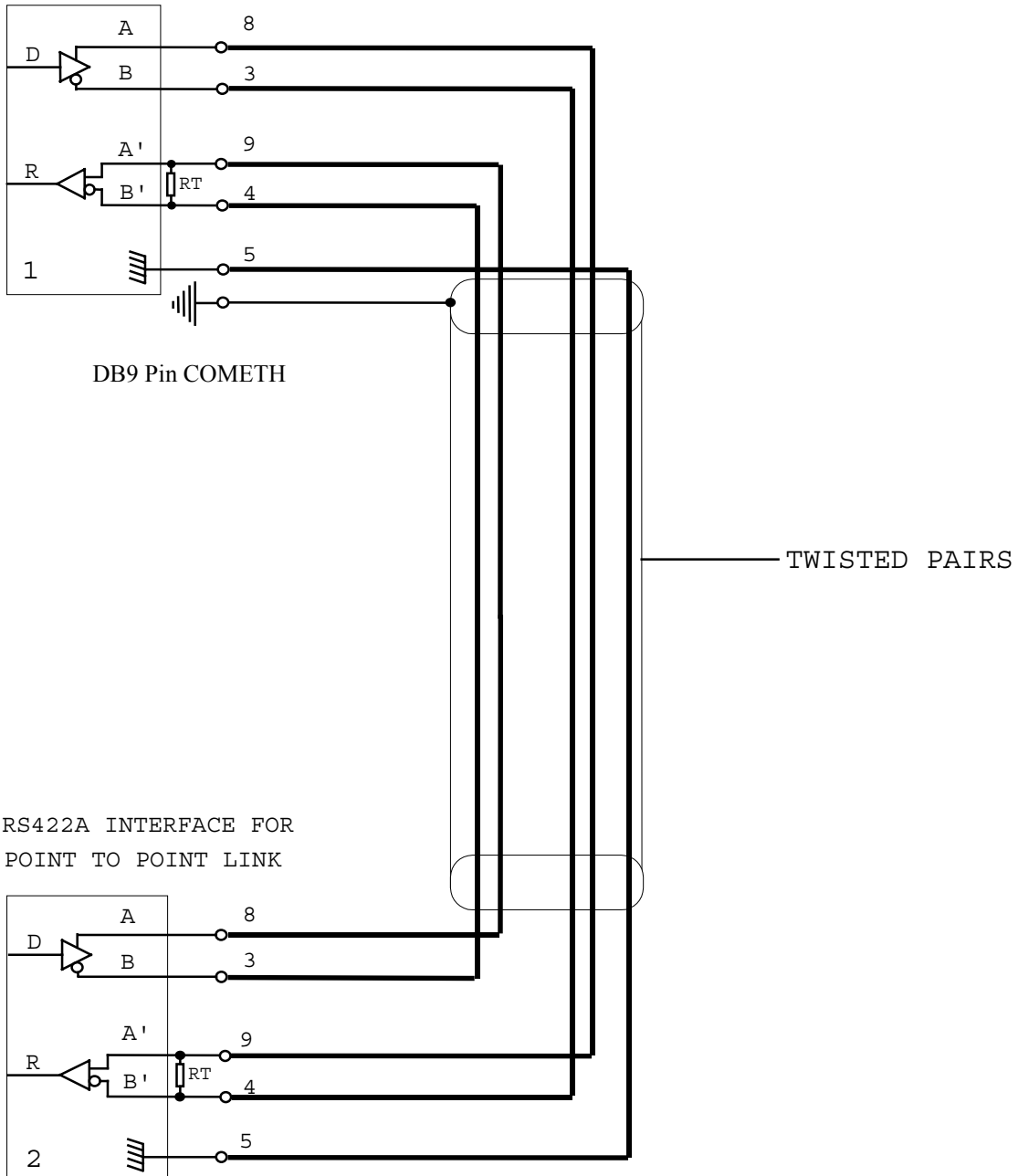
### VII.3 Cable length for RS422A and RS485



## VII.4 RS422A Cabling example

### RS422A FULL-DUPLEX POINT TO POINT CABLING

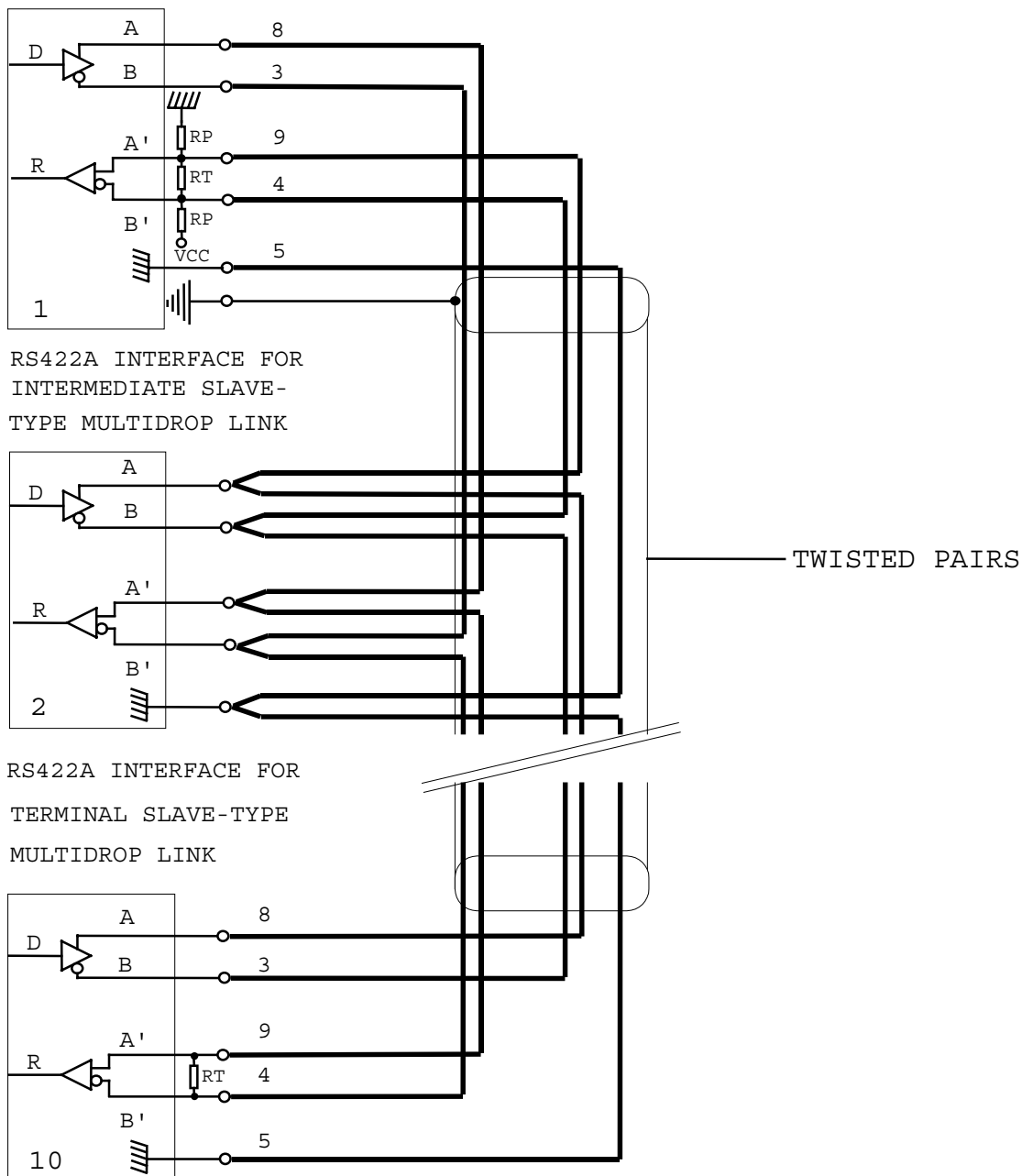
RS422A INTERFACE FOR  
POINT TO POINT LINK



RS422A INTERFACE FOR  
POINT TO POINT LINK

# RS422A FULL-DUPLEX MULTIDROP CABLING

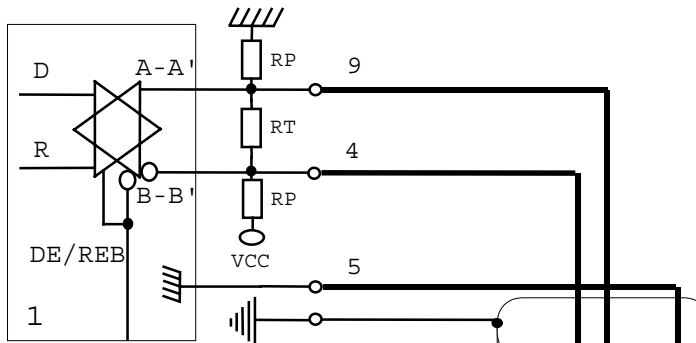
RS422A INTERFACE FOR  
MASTER-TYPE MULTIDROP LINK  
(POLLING SELECTING)



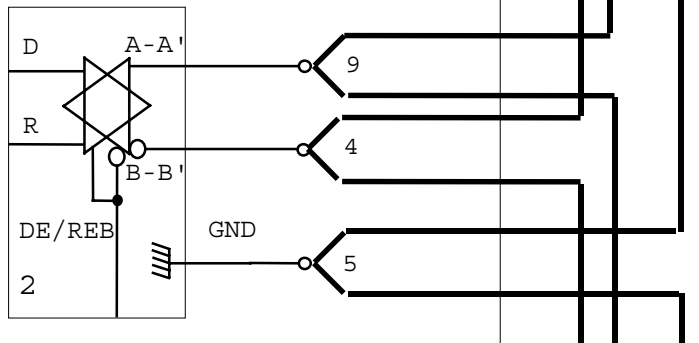
## VII.5 RS485 cabling example

### RS485 HALF-DUPLEX MULTIDROP CABLING

INTERFACE RS485 FOR MASTER-  
TYPE MULTIDROP LINK  
(POLLING-SELECTING)

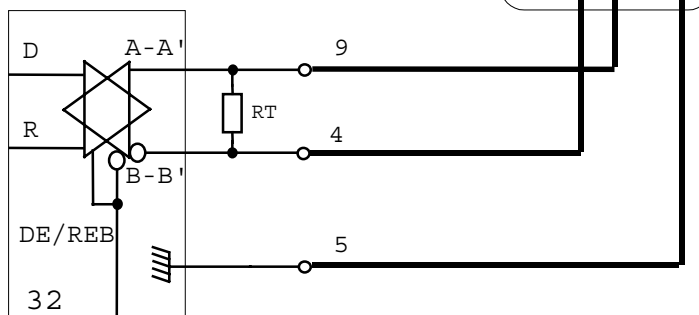


RS485 INTERFACE FOR  
INTERMEDIATE SLAVE-TYPE  
MULTIDROP LINKS  
(POLLING-SELECTING)



— TWISTED PAIRS

RS485 INTERFACE FOR  
TERMINAL SLAVE-TYPE  
MULTIDROP LINKS  
(POLLING-SELECTING)



---

## VIII GETTING STARTED

---

This chapter describes the required steps to get WL-COMETH device on-line and working.

### VIII.1 Determine the needs of your application

- Serial data format and baudrate
- Serial control signals driving source
- Electrical type of your serial interface
- What kind of application will use the COMETH. This will determine the COMETH firmware to use, as follows:

#### Firmware selection criterions

Firmware	use
DOWNLOAD	to upgrade the other firmwares.
MODBUS	for MODBUS/TCP or MODBUS tunnelling.
SERVERCOM	for COM port redirection or raw data tunnelling.
MULTIPOINT	for multidrop applications and master/slave replacement (only on the WL-COMETH II and WL-DONGLE)
TCPCLIENT	allows a serial device to call in a network server, or raw data tunnelling.

#### If you want to use the MODBUS protocol:

- in any case you can use the MODBUS firmware;
- if there is only one serial master, and one serial slave or several serial slaves all connected on the same RS485 cable, you can also use tunnelling with a couple of SERVERCOM and TCPCLIENT.
- if the masters are on the network, not on a serial link (they use MODBUS/TCP) you must use the MODBUS firmware on the slave side only;
- if the slaves are scattered among several access points in the network, you must use the MODBUS firmware on each slave side.

#### If you want to exchange serial data (no control signals) between two or more devices through a LAN:

- use COMETH MULTIPOINT on all the serial attachments involved.

#### If you want to tunnel serial data through a TCP/IP network:

- if not loosing data is more important than speed, network bandwidth and serial control signals, you must use SERVERCOM on one side, TCPCLIENT on the other side.

#### If you want to access a remote serial device from your application:

- usually SERVERCOM on the device side will do that;

#### If you want a remote serial device to call into your application:

- TCPCLIENT is what you need.

### VIII.2 Collect network characteristics

You will need at hand the following information about your WLAN:

Will the COMETH use DHCP :	<input type="checkbox"/>		
If DHCP is used (DHCP is no present in WL-COMETH version I):			
• Does the network administrator (or the DHCP server) require a specially crafted Client ID (DHCP option 61)?	<input type="checkbox"/>	client identifier:	_____
• Does the network administrator (or the DHCP server) require a Client Host Name (DHCP option 12)?	<input type="checkbox"/>	hostname identifier:	_____
If DHCP is not used (or not present for WL-COMETH version I):			
• IP address for the WL-COMETH (see below):			_____
• Does your WLAN need use of a netmask?	<input type="checkbox"/>	Netmask value :	_____
• Will the data connection or the admin connection cross a gateway?	<input type="checkbox"/>	Gateway address:	_____
Wifi information :			
• SSID of your WIFI network		SSID Value	_____
• Channel used by other device (only in AD-HOC mode)		Channel value	_____
• Wifi mode used by our network	<input type="checkbox"/>	AD-HOC mode	
	<input type="checkbox"/>	Infrastructure mode	
• Wep key used on our WIFI network		Wep Key 1	_____
		Wep Key 2	_____
		Wep Key 3	_____
		Wep Key 4	_____

**WL-COMETH IP address:** You must assign an IP address to the WL-COMETH. **YOU CANNOT JUST PICK ONE AT RANDOM** and wish it will work! The chosen address must meet the following requirements :

- Its network part must match the network part of other devices on the same WLAN,

- Its host part must be different from any other devices on the same WLAN (beware of printers, routers and gateways),
- Its host part must not be a reserved value like 0 or 255.

**NETMASKS:** If no netmask applies, it can be deduced from the IP address class:

Class A	netmask 255.0.0.0
Class B	netmask 255. 255.0.0
Class C	netmask 255. 255. 255.0

If in doubt, please ask to the local Network Administrator.

### **VIII.3 Connect power adapter**

Connect the power supply to the WL-COMETH.

Notice WL-COMETH has no ON/OFF switch. It turns on automatically when power supply is connected.

### **VIII.4 Administration by RS232 serial port**

This is the recommended procedure to install a new WL-COMETH. In some cases you can install a new WL-COMETH through the WLAN (refer to paragraph IX.5 “Administration by WLAN”)

#### **VIII.4.1 Select Administrator mode**

Push the switch towards the « Admin » position. The orange (DIAG) light should blink twice per second. If it is not the case, try pushing the switch in the opposite direction.

#### **VIII.4.2 Connect to a serial port**

This step is required to change the default WL-COMETH IP address. Below we describe how to do this with a PC with Windows. Other devices (ANSI console...) or operating systems (Linux with “minicom” or “cu”...) can be used, but this is beyond the scope of this manual.

The WL-COMETH has one male DB9 RS232 connector with DTE cabling. You can use the provided null modem cable and plug it directly, into a standard DB9 male connector (PC COM port for example)

#### **VIII.4.3 Run Hyperterminal**

When asked to choose a modem or port, select a direct connection to COMx (COMx being the COM port on which you plugged the WL-COMETH).

Select the following port parameters : 2400 bauds (bits/second), 8 bits, parity none, 1 stop bit, no flow control.

Hyperterminal now displays a blank window. Hit the « ENTER » key to display the admin prompt

#### **VIII.4.4 Proceed to paragraph IX.6 “TCP/IP configuration”**

## **VIII.5 Administration by WLAN**

The default IP address of the WL-COMETH is 192.168.1.253. You can install the WL-COMETH for the first time by WLAN only if your network can match this requirement and the SSID of the AP is “acksys”. Only one new WL-COMETH can be turned on in the WLAN at a given time, until you have assigned a different IP address on each WL-COMETH. Otherwise conflicts will result.

### **VIII.5.1 WL-COMETH preparation**

The « Admin » switch must be off. In this case the orange LED must not blink twice per second.

### **VIII.5.2 Computer configuration**

Configure a computer with an IP address 192.168.1.x where  $x \neq 253$  and  $x \neq 255$  and  $x \neq 0$  and  $x \neq$  any address already assigned on the LAN and WLAN.

Check that the computer is connected to the same WLAN than the WL-COMETH.

### **VIII.5.3 Access Point configuration**

Configure your AP with SSID “acksys”. Please refer to your AP documentation.

Check the link between WL-COMETH and AP, with the RF signal quality LEDs and the PING command.

### **VIII.5.4 Run Telnet**

```
C:\> telnet 192.168.1.253
```

Telnet displays a banner and a prompt from the WL-COMETH

```
Type : login root
```

```
Password : root
```

### **VIII.5.5 Proceed to paragraph IX.6 “TCP/IP configuration”**

## VIII.6 TCP/IP configuration

The IP address of the WL-COMETH must be unique on the network. You can statically specify the address you want by means of the administration commands, or you can use an existing DHCP server on the network to give you an available address. If you define both DHCP and static IP address, the DHCP configuration will override the static IP.

### VIII.6.1 Static IP address configuration

SSID configuration, replace *ID* by your AP SSID:

```
root> set net ssid ID
```

In the following lines, replace XXX.YYY.ZZZ.TTT by the IP address and netmask you chose for the WL-COMETH :

```
root> set net ip XXX.YYY.ZZZ.TTT
root> set net mask XXX.YYY.ZZZ.TTT
```

Now you should save the configuration changes :

```
root> save
root> reset
```

**Example:** this sample session will reinstall factory values:

```
root> set net dhcp off      (not available on WL-COMETH I)
OK
root> set net ip 192.168.1.253
OK
root> set net mask 255.255.255.0
OK
root> save
OK
root> reset
WL-COMETH SERVERCOM version 3.6.2.0, Administration mode ready
```

### VIII.6.2 Static router / gateway configuration

If the COMETH and the network application using it, are not on the same Ethernet LAN (i.e., if they are separated by one or more gateways (also caller routers), you must set the nearest gateway address into the COMETH, and you must set the maximum number of gateways to cross (if the factory default of 10 is not enough).

The following line is required only if you will cross more than ten gateways:

```
root> set net metric n
```

“*n*” is the number of gateways to cross . If you use a DHCP server that provides gateway information to the COMETH, you won’t need the following command. Otherwise, the following command is required if you need to cross one or more gateways :

```
root> set net gateway XXX.YYY.ZZZ.TTT
```

“*XXX.YYY.ZZZ.TTT*” is the address of the gateway closest to the COMETH (here, ‘closest’ means that it is on the same Ethernet LAN).

Do not forget to save the configuration changes :

```
root> save
root> reset
```

### VIII.6.3 Dynamic IP address and gateway configuration with DHCP

**Note:** DHCP is not available in WL-COMETH version I.

**Diag LED blink in DHCP mode:** When the diagnostic LED (red LED) is blinking once per second, the COMETH is requesting a network configuration to DHCP server.

**Functionality of the DHCP client:**

- supports all kinds of IP configuration (Manual, Automatic, Dynamic) (see RFC 1541).
- supports option 12 of RFC 2132 (Host name).
- supports option 61 of RFC 2132 (client ID). The default client ID used is the MAC address of the COMETH, or a ClientID configured by the “set net dhcp clientid” command. The MAC address is used if ClientID is empty.
- supports DHCP agent or BOOTP agent specified in RFC 2134.
- supports the infinite lease.

**Limitation of DHCP client in COMETH**

- the lease of DHCP server must be less than 24,9 days.
- RFC 2136 (DNS update with DHCP information) is not supported on the COMETH side. So, you need a DHCP server which supports RFC 2136. (for example, the Windows 2000 DHCP server).
- the COMETH has no IP address as long as the diag LED blinks.
- only the IP address, subnet mask, gateway address and lease time are used in the configuration information returned by the DHCP server.

In order to give an IP address to a COMETH, the DHCP server must be able to uniquely identify the requesting device (i.e. the COMETH). Hence the COMETH must provide a unique identification to the DHCP server.

Usually the MAC address is used for this purpose. Some administrators or DHCP servers require other kinds of identification. Hence you can either set up manually the “Client ID” (DHCP option 61), else the MAC address will be used as a string identifier. If you need, you can also set up a “Host Name” (DHCP option 12). The “Client ID” is always sent to the server. The “Host Name” is sent only if set manually.

**Example 1:** this sample session will use only the MAC address :

```
root> set net dhcp on
OK
root> show net dhcp clientid
undefined client id
root> show net dhcp hname
undefined host name
```

Now you should save the configuration changes :

```
root> save
root> reset
```

**Example 2:** use a network administrator-provided name ‘cometh-b12a27’ for the COMETH device:

```
root> set net dhcp on
OK
root> set net dhcp clientid cometh-b12a27
OK
root> show net dhcp
DHCP on
root> show net dhcp clientid
cometh-b12a27
root> show net dhcp hname
undefined host name
```

Now you should save the configuration changes :

```
root> save
root> reset
```

**Example 3:** use the MAC address for client id, and also a network administrator-provided host name “cometh12.mydomain.com”:

```
root> set net dhcp on
OK
root> set net dhcp clientid
OK
root> set net dhcp hname cometh12.mydomain.com
OK
root> show net dhcp
DHCP on
root> show net dhcp clientid
undefined client id
root> show net dhcp hname
cometh12.mydomain.com
```

Now you should save the configuration changes :

```
root> save
root> reset
```

## VIII.7 Activate the relevant firmware for WL-COMETH version I

In the first installation step you chose the COMETH firmware that most suits your needs. Now it is time to activate this firmware and set its own parameters.

Say that you determined that you need to activate the TCP-CLIENT firmware. Connect to the administration (either through the network or the serial interface), identify yourself, then display the list of available firmwares:

```
root> show prog list
```

file	status	name	version	update...
/0	valid	DOWNLOAD STD	3.4.x.0	3.0
/1	valid	DOWNLOAD STD	3.4.x.0	3.0
/2	valid	SERVERCOM	3.6.x.0	3.0
/3	valid	TCP-CLIENT	2.2.x.0	3.0
/4	valid	MODBUS	2.6.x.0	3.0
/5	invalid			

OK

Now check the currently active firmware:

```
root> show prog enable
enable software :2
loading software : 2
```

In the list you can see the number of the file holding the desired firmware: the TUNNEL firmware is in file /3. Until now the active firmware was 2, which is SERVERCOM. You must now activate the desired firmware:

```
root> set prog enable 3
root> save
root> reset
```

Other informations about firmware download, installation and selection is given in :

[download firmware user guide\(DTUS040\).pdf](#)

## VIII.8 Activate the relevant firmware for WL-COMETH version II

In the first installation step you chose the COMETH firmware that most suits your needs. Now it is time to activate this firmware and set its own parameters.

Say that you determined that you need to activate the TCP-CLIENT firmware. You must download TCP-CLIENT firmware in WL-COMETH.

You can download firmware throught WLAN interface, or serial interface.

### VIII.8.1 Download firmware through WLAN interface.

In command example 192.168.1.253 is the IP address of the WL-COMETH. If your WL-COMETH doesn't have this ip address, change this by the correct IP address.

- Download the latest version of the firmware on acksys web site ([www.acksys.fr](http://www.acksys.fr)), or get the firmware in the CD.

- In the windows “start” menu, select execute, type “**cmd**” and click on OK button (you must see a DOS window).
- Check your network topology (see [chapter VIII.3](#))
- Make a telnet to your COMETH with telnet command  
C:\telnet 192.168.1.253
- In the telnet window, type this command  
> login root  
password : root  
root>set upgradeperm allow  
root>save  
root>reset
- Download firmware with the tftp command :  
C:\tftp -i 192.168.1.253 put tcpclient.ftp /
- If the download is correct the WL-COMETH reboots.
- After upgrade, the network configuration of WL-COMETH is not changed.

### VIII.8.2 Download firmware through serial interface

You cannot download a new firmware through serial interface on WL-COMETH version I.

- Upload the latest version of firmware on acksys web site (www.acksys.fr), or get the firmware in the CD.
- In the windows “start” menu, select execute, type “**cmd**” and click on OK button (you must see a DOS window).
- Run a terminal emulator (hyperterminal for example or ATTY provided by acksys on CD).
- Configure a terminal emulator with 8 data bits, 1 stop bit, no parity, no flow control, 2400 bauds.
- Push the admin switch towards the « Admin on» position. The orange (DIAG) light should blink twice per second. If it is not the case, try pushing the switch in the opposite direction.
- On terminal you can see an administration banner and the WL-COMETH prompt. Press the enter key if you don’t see the WL-COMETH prompt.
- On the terminal, type these commands :  
root>set upgradeperm allow  
root>save  
root>reset
- After reset the administration mode does not work anymore. This is normal. Configure terminal to 115200 bauds, and type “C” (in upper case). CLIENTSERVER” must appear in the terminal window.
- If you can see this text close the terminal window and make a SLIP connection. To configure a SLIP connection please refer to the section “VII.8.3 [Configure a SLIP connection](#)”.
- When the SLIP connection is establish, download the firmware with the tftp command :  
C:\tftp -i 192.168.2.253 put tcpclient.ftp /
- If the download is correct the WL-COMETH reboots.
- After upgrade, the network configuration of WL-COMETH is not changed and the SLIP connection is disabled.

### VIII.8.3 Configure a SLIP connection

Windows 9x and Windows Me do not handle SLIP connections.

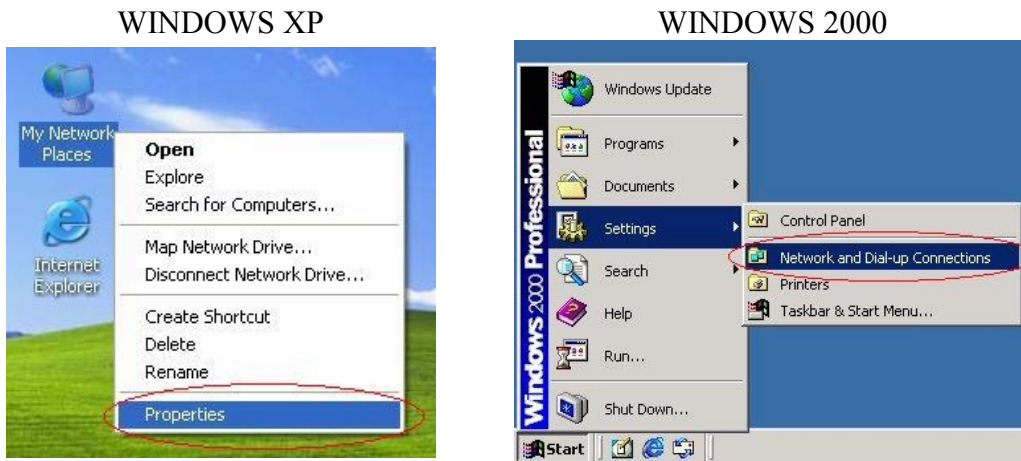
For other operating systems (Windows 2000, XP, Linux...) you must set up your SLIP connection with these parameters :

115200 bauds, 1 stop bit, 8 data bits, no parity, no flow control (neither hardware nor software), and no authentication.

We explain below the SLIP configuration for Windows 2000/XP/NT 4. Screenshots are dependant of the Windows version and service pack.

#### VIII.8.3.1 SLIP Configuration on Windows 2000/XP

1. *start | settings | Network and Dial-up Connections*

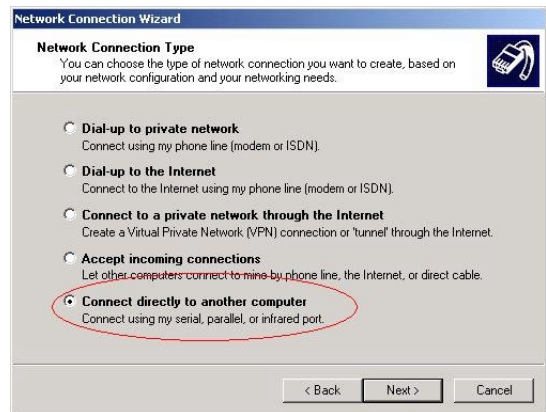
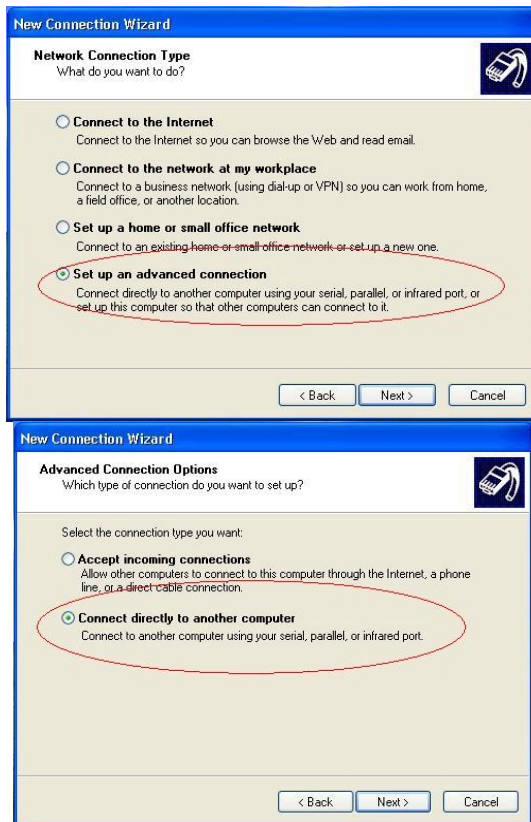


2. Open *Network and Dial-up Connections*
3. Double click the icon *Make New Connection*.
4. This will open a *Network Connection Wizard*, and click *Next*.

5. Check *connect directly to another computer* and click *Next*.

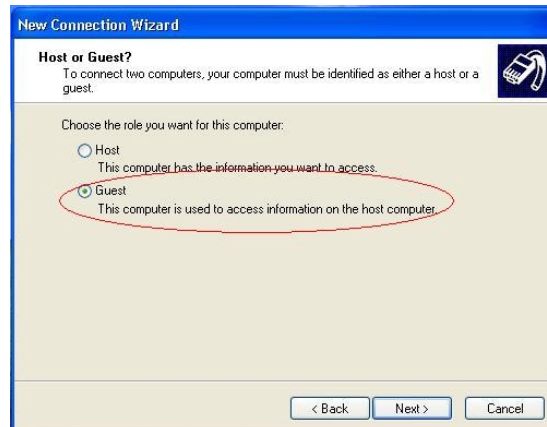
WINDOWS XP

WINDOWS 2000



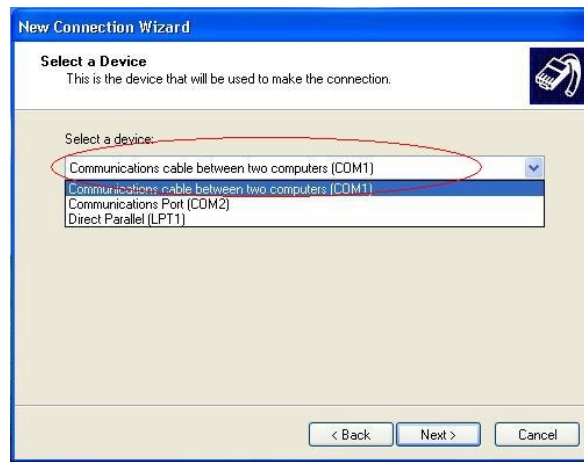
6. Check *Guest* and click *next*

WINDOWS XP / WINDOWS 2000



7. Select **Communication cable between two computers (COM1)**, and click **Next**.

WINDOWS XP / WINDOWS 2000



8. Select if you want share this connection with all user, and click **Next**.
9. click on buton **finish**.

WINDOWS XP / WINDOWS 2000



10. At this time you must have a connection dial-up window.

WINDOWS XP / WINDOWS 2000

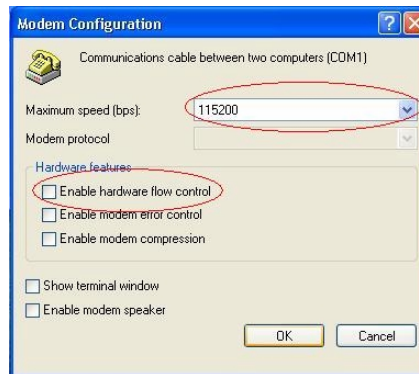


11. Click on the **Properties** button.
  12. In the **general** tab, click on the **configure** button
- WINDOWS XP / WINDOWS 2000

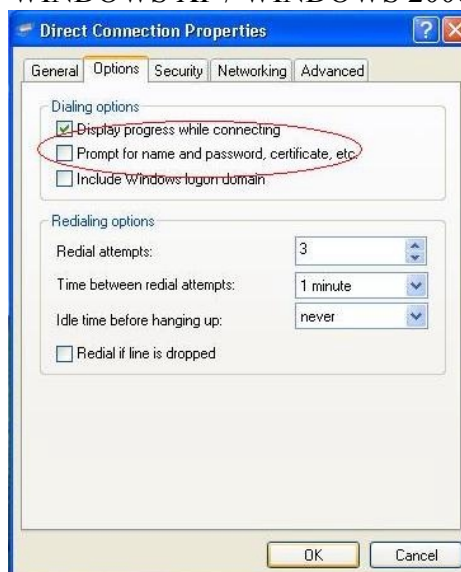


- a. Select 115200 for the maximum speed of the connection.
- b. Uncheck **Enable hardware flow control**.

WINDOWS XP / WINDOWS 2000

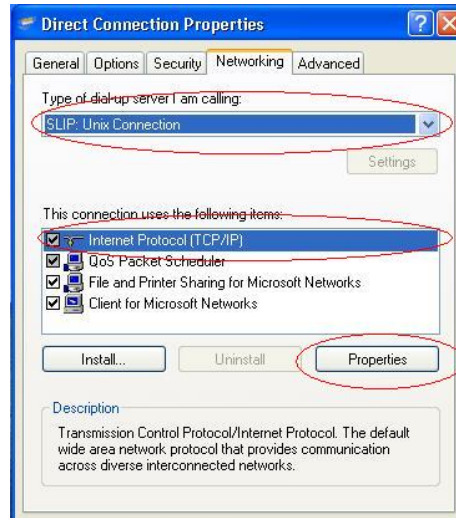


13. In the **options** tab, uncheck **Prompt for name and password, certificate, etc.**
- WINDOWS XP / WINDOWS 2000



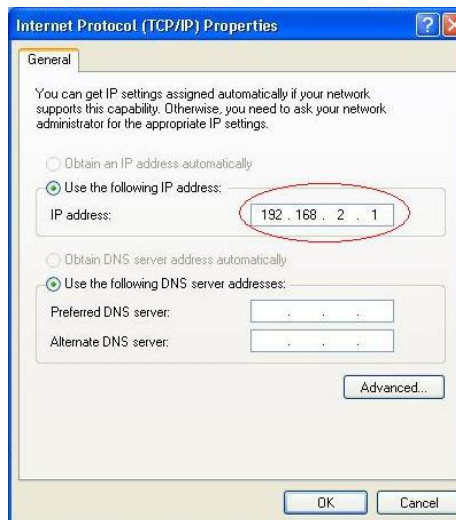
14. in the *Networking* tab
  - a. Select in server type *SLIP : unix connection*.
  - b. Select *Internet protocol (TCP/IP)* and click on *Properties* button.

WINDOWS XP / WINDOWS 2000



- i. Enter Ip address. For example enter 192.168.2.1  
Note : The network part of the chosen IP address must not be already used by another network connection (such as a LAN card).
- ii. Click on the *Ok* button.

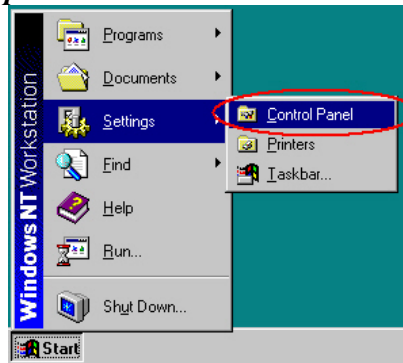
WINDOWS XP / WINDOWS 2000



- c. Click on *Ok* button
15. connect to WL-COMETH with the *connect* button.

### VIII.8.3.2 SLIP Configuration on Windows NT

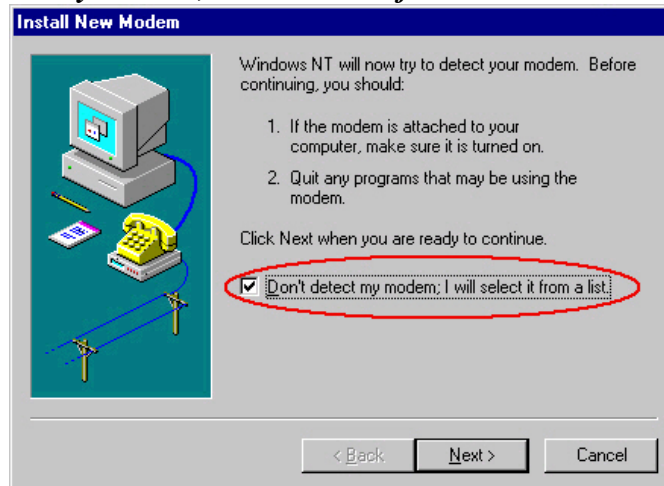
1. *Start | Settings -| control panel*



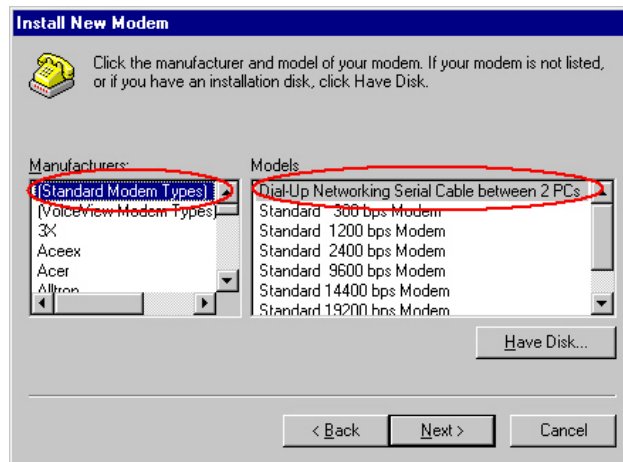
2. click on the *modem* icon



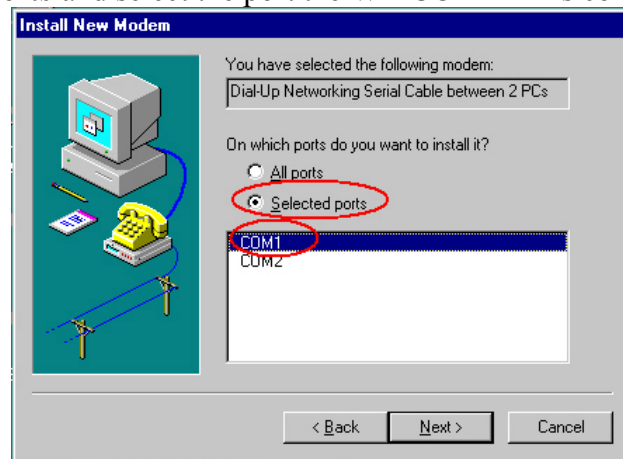
3. check *don't detect my modem; I will select it form a list* and click *next* button



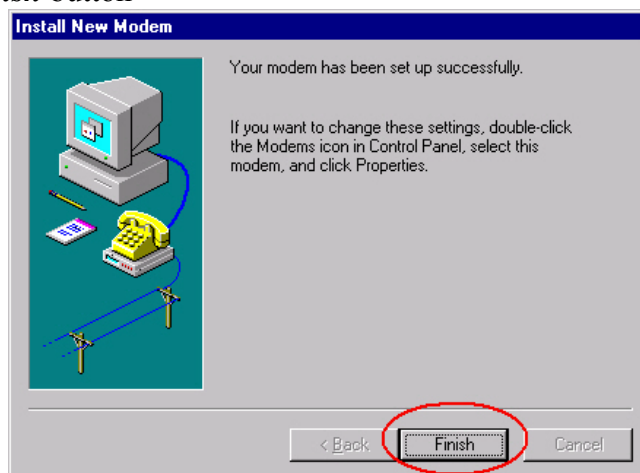
4. Select **Standard Modem types**, **Dial-Up Networking cable between 2 PCs** and click **next**



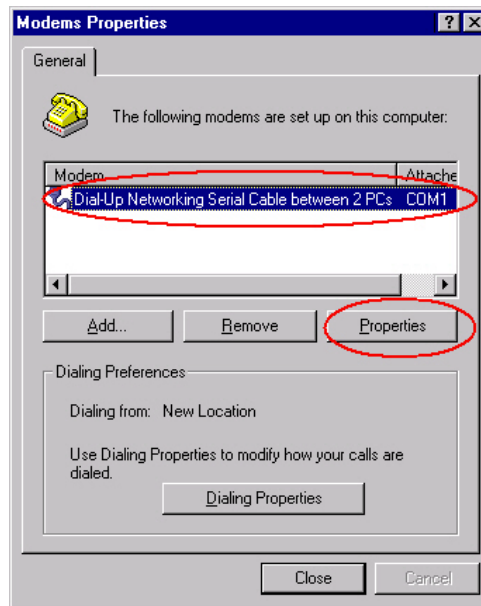
5. check **Selected ports** and select the port the WL-COMETH is connected to



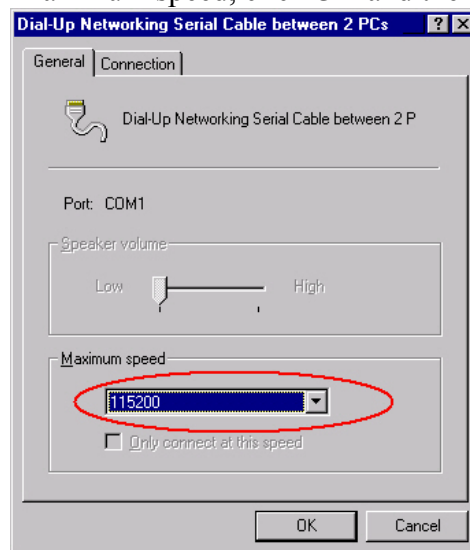
6. click on the **Finish** button



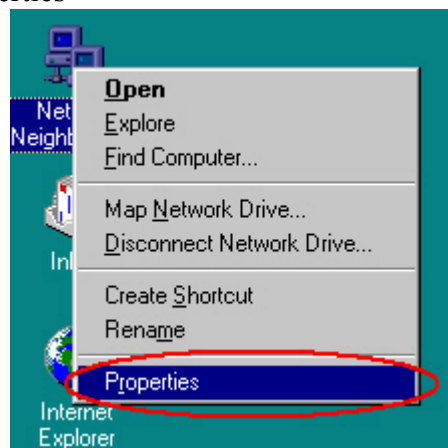
7. Select your new modem, and click the **Properties** button



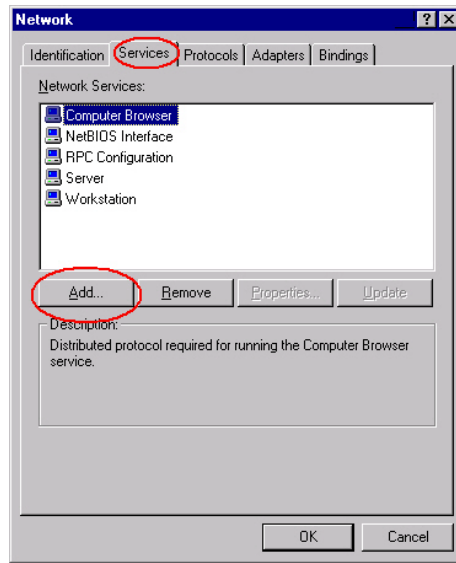
8. Select **115200** baud for maximum speed, click **OK** and the **Close** button .



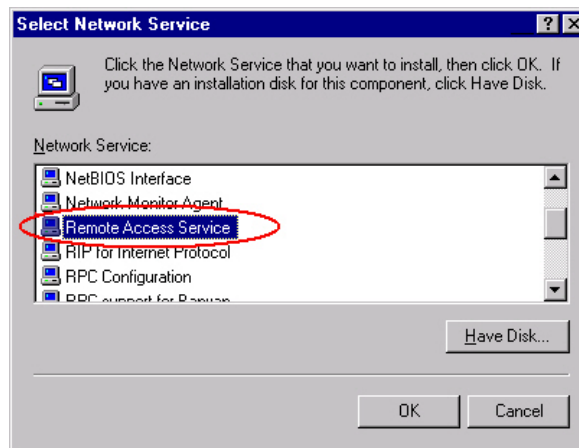
9. Open the network properties



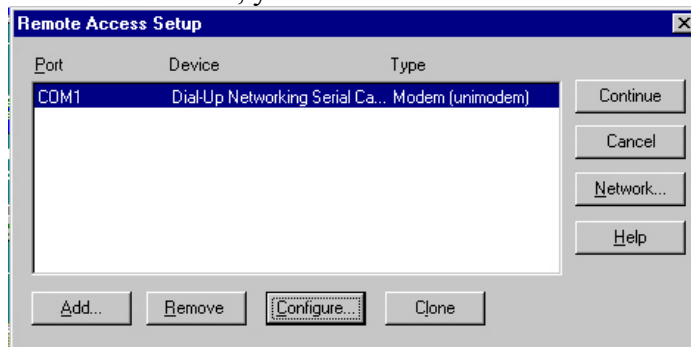
10. Select the *Services* tab and click the *Add* button



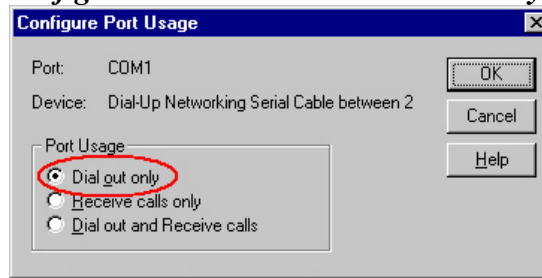
11. Select *Remote Access Service* and click *OK*



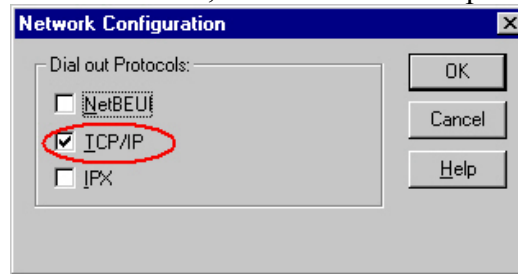
12. When the installation is finished, you have this window



- a. Click on the *configure* button and check *Dial out only*

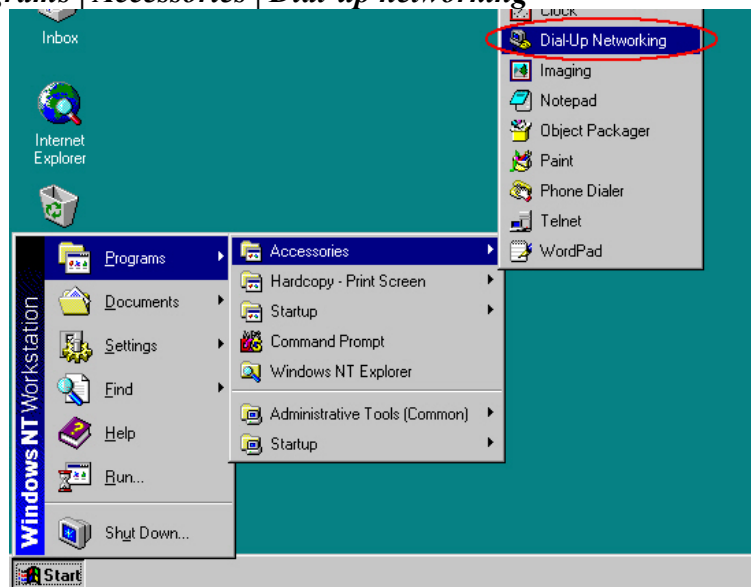


- b. Click on the *Network* button, and check *TCP/IP* protocol then *OK*

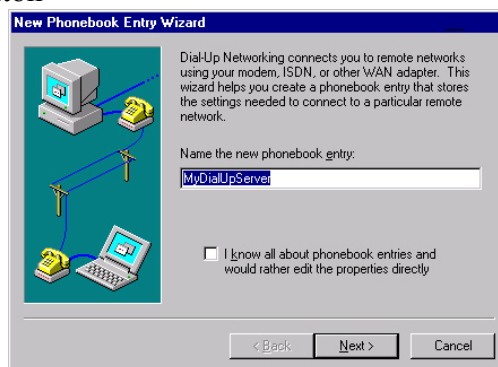


- c. Click on the *Continue* button, and restart computer.

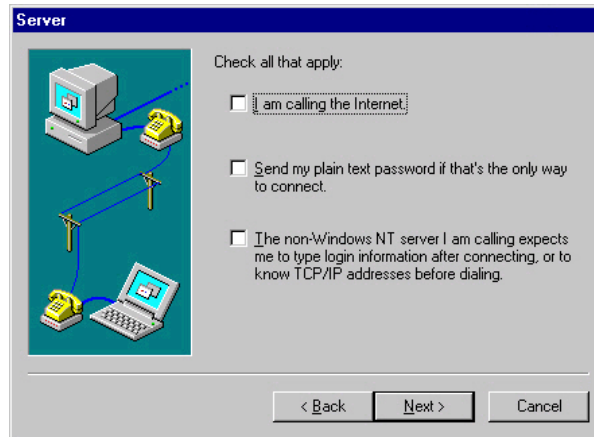
### 13. Start | Programs | Accessories | Dial-up networking



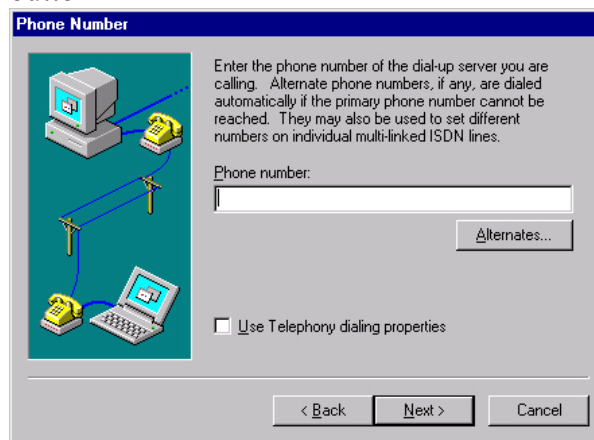
- 14. Click on the *Next* button



15. Click on the *Next* button



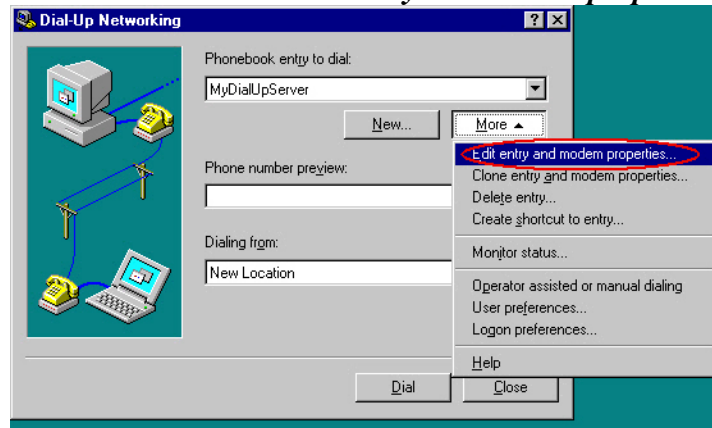
16. Click on the *Next* button



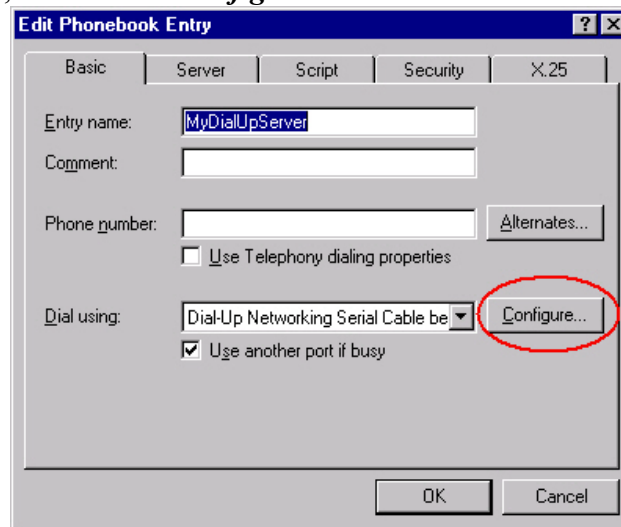
17. click on the *Finish* button



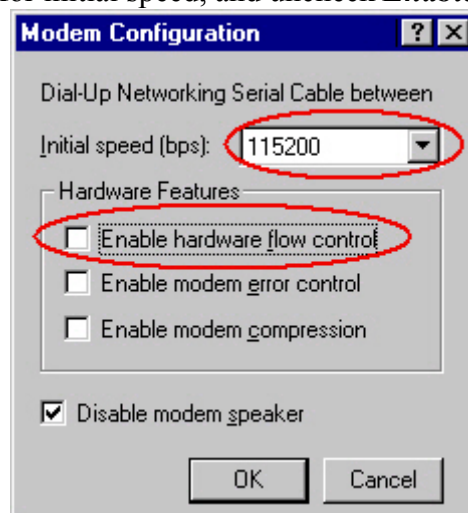
18. click on the *More* button and select *edit entry and modem properties*



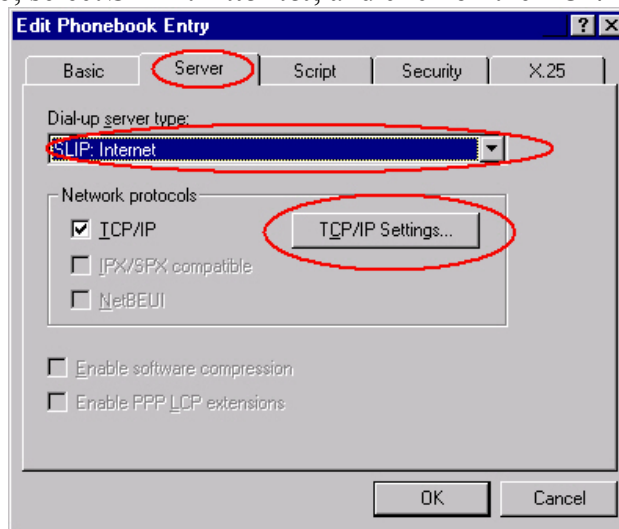
19. On the *Basic* tab, click on the *Configure* button



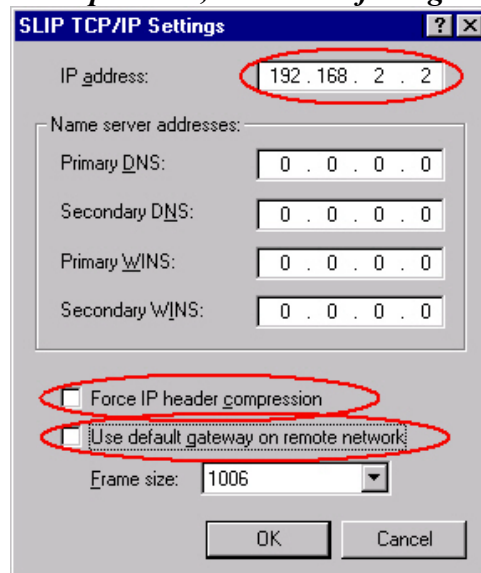
a. Select *115200* for initial speed, and uncheck *Enable hardware flow control*



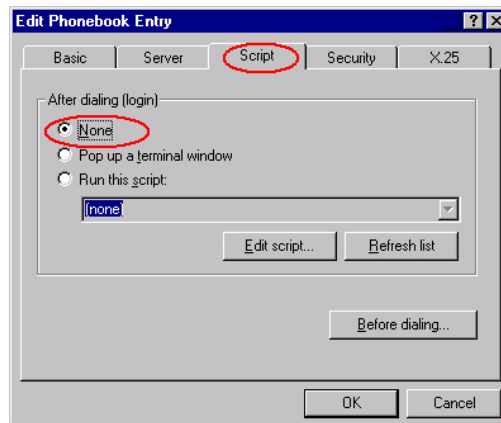
20. On the *Server* tab, select *SLIP : Internet*, and click on the *TCP/IP Setting* button



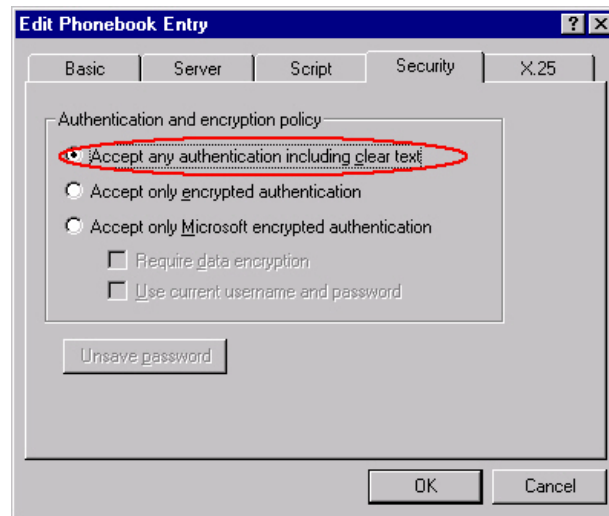
a. Enter the ip address of the computer (for example *192.168.2.2*), and uncheck *Force Ip header compression*, and *Use default gateway on remote network*



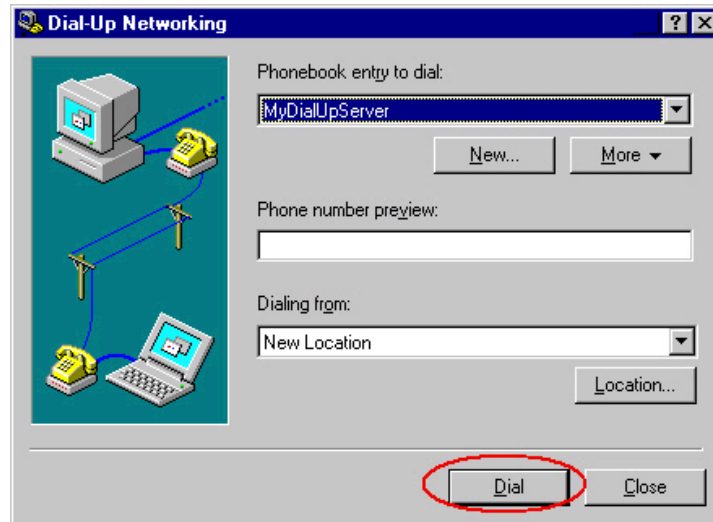
21. On the *script* tab, check *None*.



22. On the **Security** tab check **Accept any authentication including clear text** and click **OK**



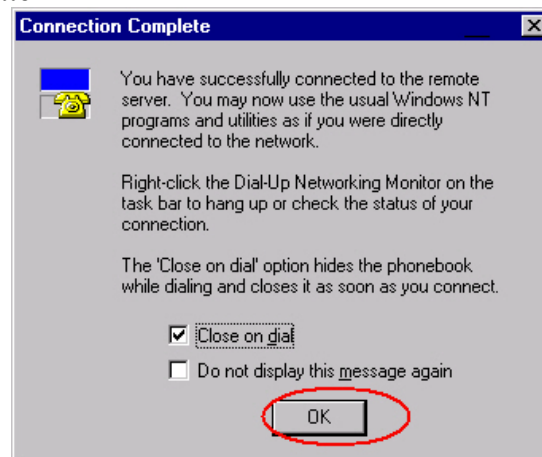
23. Click on the **Dial** button



24. click on the **OK** button



25. Click on the **OK** button



26. If the connection is ready, you can see an icon in system tray.



#### VIII.8.4 Use the SLIP connection

Run the SLIP connection on your computer (for SLIP configuration see section “ [SLIP Configuration on Windows 2000/XP](#) ” or “ [SLIP Configuration on Windows NT](#) ”)

When the SLIP connection is ready you can check it with the PING command. For instance, if the SLIP IP address on the PC side is 192.168.2.1, WL-COMETH will respond to any IP address in the range 192.168.2.2 to 192.168.2.254.

**Example:**

```
C:\>arp -d 192.168.2.3
C:\>ping 192.168.2.3
Pinging 192.168.2.3 with 32 bytes of data :
Answer from 192.168.2.3 : bytes=32 time<10ms TTL=64
Answer from 192.168.2.3 : bytes=32 time<10ms TTL=64
```

Your WL-COMETH is ready for SLIP upgrade. You can use the TFTP command to upgrade the WL-COMETH firmwares.

If the PING command results in an error, check the SLIP link configuration. Also make sure that your WL-COMETH is [WL-COMETH version II](#).

**NOTE :** Ping syntax and result depends on the operating system type and version.

#### VIII.9 Install the WL-COMETH /WL-DONGLE in its final location

Now you can unplug the WL-COMETH from the administration PC.

**If administration by serial mode has been selected push the mode switch on the other side** (thus allowing data to go from Ethernet to the asynchronous interface).

Check the cabling of your device against the cabling of the WL-COMETH (see section VI “Security)

Several levels of security are parametrables. In its default setting, the WL-COMETH is does not activate any function of advanced security. To harden the confidentiality of the network exchanges, see [chapter X.2 Security](#).

## **VIII.10 Other configuration**

Many other configuration options are available. You can enforce some setup or behavior of the asynchronous serial interface, change more network parameters like the data TCP port, set up security options, and so on. Please refer to the « Advanced configuration » section. Check also the “parameters settings” section of the relevant firmware document (i.e. SERVERCOM, MULTIPOINT, MODBUS...).

To use the SERVERCOM mode, see documentation:

[\*\*SERVERCOM UserGuide \(DTUS043\).pdf\*\*](#)

To use the MODBUS TCP mode, see documentation:

[\*\*MODBUS-TCP UserGuide \(DTUS041\).pdf\*\*](#)

To use the TCPCLIENT mode, see documentation:

[\*\*TCPCLIENT UserGuide \(DTUS045\).pdf\*\*](#)

To use the MULTIPOINT mode, see documentation:

[\*\*MULTIPOINT UserGuide \(DTUS056\).pdf\*\*](#)

*You are now ready to use the WL-COMETH.*

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## IX TROUBLESHOOTING

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Please check the following thoroughly before calling for support. If you must call, we will need complete information about your network topology, IP addresses of intervening devices, description of your device's serial connector, model of the computer and operating system.

**The checks should be done in the order given below.**

### IX.1 Checking the hardware

Twelve LEDs allow hardware diagnostic.

#### **Power :**

- This led lights up when the WL-COMETH is correctly powered.

If the POWER LED stays off, it means that your power supply is bad, or incorrectly connected.

#### **Diag :**

- In Administration mode, this LED flashes twice per second, unevenly (bip bip... bip bip...)
- In Exploitation mode, this LED flashes when an error is detected in characters received on the asynchronous interface
- When resetting, this LED stays light until the WL-COMETH is ready to use (usually in less than one second, or in about 10 seconds if you issued a "set prog enable" command before)
- Shortly after reset, if DHCP is enabled, the LED flashes once per second until network parameters are acquired
- The TCPCLIENT firmware flashes this LED five times per second whenever it is not connected to a server.
- (in WL-COMETH version II only). When the WL-COMETH cannot link to an Access point, this LED blinks with the six RF signal quality LED

If the "Diag" LED stays light at power up, the WL-COMETH is out of order. Try to power it down, and then up again after a few seconds.

If the DIAG LED flashes to indicate Administration mode, push firmly the « Admin » switch in the opposite position (OFF).

#### **Serial Tx/Rx :**

- This LED flashes when sending or receiving data on the asynchronous serial interface.

If the Serial Tx/Rx LED stays off while your device is sending data, it means that the RS cable is bad, improperly connected, or some kind of flow control forbids transmission.

If the Serial Tx/Rx LED stays off while you are sending data to your device, it means that some kind of flow control forbids transmission, or the WL-COMETH does not receive network data frames.

If the serial Tx/Rx LED stay on while you are not sending data to your device and your device is not sending data, it means that the RS cable is

bad, improperly connected, A & B or A' & B' are inverted, line polarization is required in RS422A multidrop and RS485 mode.

**RS232 activated :** (only on WL-COMETH version II).

This LED lights up when the RS232 electrical interface is selected.

**RS422/485 activated :** (only on WL-COMETH version II).

This LED lights up when the RS422/485 electrical interface is selected.

**RF signal quality :**

- You can use these 6 LED to check the RF signal quality.
- (in WL-COMETH version II only). When the WL-COMETH cannot link to an Access point, this LED blinks with the DIAG LED alternatively.

If only the red LED is on, you can have communication problems with access point (AP). Change antennas orientation, or move the WL-COMETH.

*With WL-COMETH version II only :* when the WL-COMETH cannot link to an Access point, this LED blinks with the six RF signal quality LED

If all LED are flashing, the WL-COMETH is out of range of AP, or it does not find an AP with the same SSID as itself.

**WLAN Tx/Rx :**

- This LED flashes when sending or receiving data on the WLAN.

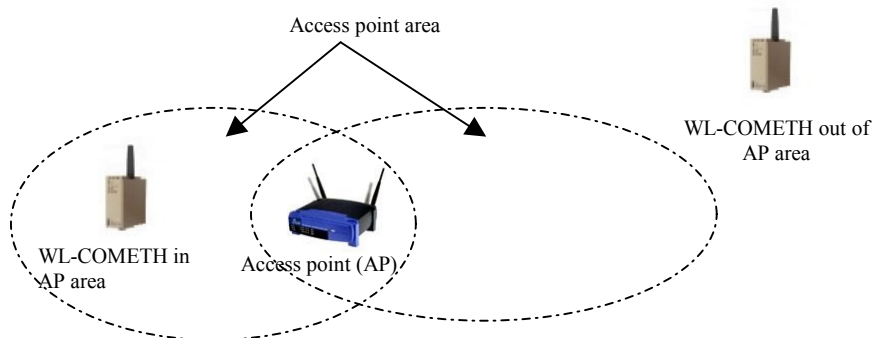
If the WLAN Tx/Rx LED stays off while your device is sending data, it means that your SSID is bad, the WL-COMETH IP address is not correct, Serial IP is not properly installed or the WL-COMETH is not connected to the same SSID than your device.

If the WLAN Tx/Rx LED stays off while you are sending data to your device, it means that your cable is bad, the WL-COMETH IP address is not correct, Serial IP is not properly installed or the WL-COMETH does not receive data on the asynchronous serial interface.

## IX.2 Checking WLAN topology

### IX.2.1 WL-COMETH working in infrastructure mode

You must have an access point to use the WL-COMETH.



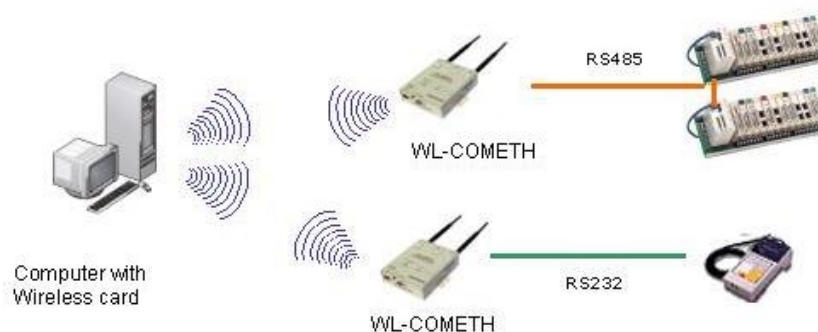
If the WL-COMETH is out of the AP area, all RF signal quality LEDs, WLAN Tx/Rx LED, the Diag LED blinks. If WL-COMETH is in the AP area, you can see RF Signal quality reception on the LEDs.

If you use several AP, make sure that all AP are in the same network, the WL-COMETH version I does not support DHCP.

If the WL-COMETH is in the AP area, but you can't access to the WL-COMETH, check the SSID on both the AP and the WL-COMETH. SSID is the **case sensitive** network identifier. If the WL-COMETH and AP do not have the same SSID, the WL-COMETH cannot connect to the AP. In this case the RF signal quality LEDs, WLAN Tx/Rx LED, Diag LED blink.

For more information on RF signal quality of the WL-COMETH, see chapter XI.1 “Checking the hardware”.

### IX.2.2 WL-COMETH working in AD-HOC mode



In AD-HOC mode, you must have the same SSID and channel in all the devices. If the WL-COMETH does not have the same channel, you cannot communicate with it.

In this mode please ignore the quality LEDs indications.

### IX.3 Checking the network topology

In the following examples the WL-COMETH IP address is 192.168.1.253 ; the computer used for the tests has IP address 192.168.1.244.

- First you must ensure that the WL-COMETH has a unique IP address on the local network. Turn off the WL-COMETH (unplug supply connector), then try to PING the WL-COMETH address from a computer connected to the local network. This should result in an error or timeout :

```
C:\>arp -d 192.168.1.253
C:\>ping 192.168.1.253
Pinging 192.168.1.244 with 32 bytes of data :
Request timeout.
Request timeout.
Request timeout.
Request timeout.
```

The « Request timeout » error messages are normal and expected in this case. If this is not the case, another host has the same IP address. Correct the problem.

If the answer is some message like « no route to host », the computer you are using for the test has no access to the WL-COMETH's WLAN, or the network part of the IP address of the WL-COMETH is incorrect.

- Now turn on the WL-COMETH (plug in the power supply connector) and try to PING it :

```
C:\>arp -d 192.168.1.253
C:\>ping 192.168.1.253
Pinging 192.168.1.244 with 32 bytes of data :
Answer from 192.168.1.253 : bytes=32 time<10ms TTL=64
Answer from 192.168.1.253 : bytes=32 time<10ms TTL=64
Answer from 192.168.1.253 : bytes=32 time<10ms TTL=64
Answer from 192.168.1.253 : bytes=32 time<10ms TTL=64
```

If there is no answer, the IP address of the WL-COMETH is not this one. Correct the problem with the administration system. Be sure to save the changed configuration.

- Then, if you need to cross a gateway, PING the WL-COMETH from a computer installed on the other side of the gateway.

DO NOT just move the above-mentioned computer from one LAN to the other ! You must set a new, appropriate IP address in the computer when you move it from one WLAN to another.

If there is no answer, the gateway IP address or the netmask is improperly set in the WL-COMETH or in your computer. Correct the problem with the administration system. Be sure to save the changed configuration and reset the WL-COMETH.

Also the gateway itself may be improperly set. Check with your network administrator.

Did you set the gateway address (if any) in the COMETH ? Else the COMETH can receive the PING but does not know where to send the answer.

## IX.4 Checking the configuration

When you can PING the WL-COMETH, you should be able to use remote administration. Try to connect to the administration system :

```
C:\> telnet 192.168.1.253
```

If the connection is refused, another TELNET is already connected to the WL-COMETH.

You can also use the asynchronous port administration. Please refer to section IX.4 “Administration by RS232 serial port” to do this.

You can also use the easy-to-use browser admin tool available on CD or in our web site ([www.acksys.fr](http://www.acksys.fr)). It too uses telnet to set up the WL-COMETH configuration.

## IX.5 Checking the administration mode

The WL-COMETH has three administration modes:

1. Administration by telnet through WLAN interface.  
If the administration switch is on “admin off” position, the orange (DIAG) light must not blink twice per second.  
This mode can be used directly with TELNET or though the browser admin tool.
2. Administration by terminal through serial interface.  
If the administration switch is on “admin on” position, the orange (DIAG) light must blink twice per second, and when you connect a terminal ( 8 data bits, no parity, 1 stop bit, no flow control, 2400 baud) and press enter key you must see WL-COMETH prompt (ROOT>).
3. Administration by telnet through SLIP interface (except WL-COMETH I).  
If the administration switch is on “admin on” position, the orange (DIAG) light must blink twice per second, and when you connect a terminal ( 8 data bits, no parity, 1 stop bit, no flow control, 115200 baud) and press “C” key (in upper case) you must see the SLIP string “CLIENTSERVER”.

## IX.6 Checking the software

At this step, the COMETH network parameters are correctly set.

Any other problem remaining must come either from the remote side configuration, driver or software, or from mismatched configuration between the COMETH firmware in use and the remote side.

So please now refer to the relevant COMETH firmware user guide for further troubleshooting.

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## X ADVANCED CONFIGURATION

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### X.1 Access to administration commands

You can access the administration system by four means :

1. Browser administration tool through WLAN.
2. Serial terminal through the RS232 interface.
3. TELNET through the WLAN.
4. TELNET through the RS232 SLIP interface (only with WL-COMETH version II).

The browser administration tool must be installed first on a computer supporting at least internet explorer 6.0.

You run the browser administration tool by clicking on the desktop icon which was added during the installation.

You can then use simple browser menus. The browser converts transparently your configuration changes to TELNET administration commands understandable by the WL-COMETH.

The RS232 administration is activated by pushing the « ADMIN » switch to the ON position. This forbids parallel use of the WL-COMETH for data transfer.

The TELNET administration is activated by TELNETing to the IP address of the WL-COMETH, on port 23 (which is the default port for TELNET). In this way data transfer can proceed in parallel. This is useful for probing the configuration without changing it.

When TELNETing to one out of many WL-COMETH, you can wonder where is the device you are accessing. There is a field called « location » that you can set up and display, to reflect the physical location of the device.

The SLIP administration (except in WL-COMETH version I) is activated only by pushing the admin switch to on position when the “upgradeperm” is set to “allow”. You have this case if you want to upgrade your WL-COMETH firmware through SLIP interface until the upgrade is complete and successful. If you want to return in RS232 administration mode, make a TELNET on the SLIP IP address of WL-COMETH and reset upgradeperm (command “set upgradeperm deny”). Save your configuration and reset the WL-COMETH. After reset your WL-COMETH is in RS232 administration mode, but upgrade is not available.

The SLIP administration is automatically reset to RS232 administration after a successful upgrade or by setting “upgradeperm” to “deny”.

See section [Use the SLIP connection](#) for more detail on SLIP connection, and see section [Configure a SLIP connection](#) to make a configuration.

## X.2 Security

Several levels of security are parametrable. In its default setting, the WL-COMETH is not activating any function of advanced security. To harden the confidentiality of the network exchanges, you have the following functions:

- Wep key : When wep key is enabled, data is encrypted with the used key. If you want to use WEP key, all WIFI devices (Access point, bridge, computer ...) with the same SSID must use the same WEP key. To enable WEP key, you have to use the command “*set net wepkey xxx*” and “*set net usekey xxx*”. See command list for more information.
- Deny unencrypted data : If you use WEP key, you can enable this option. When this option is enabled, unencrypted wifi packet are ignored. If this option is disable unencrypted wifi packet are sent to Serial interface. To activate this option use command “set net auth xxx”. See command list for more information. This function is not available in WL-COMETH version I
- Change login and password : Don't use default login (“root” “root”) because all Acksys devices have this login by default, and it is easy to guess. You can change login with the command “*set login xxx*” and “*set password xxx*”. See command list for more information.
- Authentication mode : You can choose between two authentication mode, Open or share.
  - Open mode : In this mode all WIFI device are authenticated by their MAC adresse.
  - Share mode : In this mode all WIFI device are authenticated by their WEP key.

You can change the authentication mode with the command “set net auth xxx”  
See command list for more information. This function is not available in WL-COMETH version I.

The access to the administration system through TELNET is protected with a username (login) and password. The default setting is:

```
login root
password root
```

You can change these settings. You can display the WL-COMETH configuration without logging in, but you cannot change it. This behavior can be changed to NOT displaying the configuration as well, without the proper password.

You can forbid administration from the network, after which the WL-COMETH configuration can only be achieved by administering through serial port.

The WL-COMETH upgrade is protected. You must know the administration password to activate the upgrade module.

### X.3 Handling disconnections in TCP

Some WL-COMETH firmwares use the TCP protocol to communicate with its client application. While this protocol provides reliable data transfers, it requires the client to establish a “virtual link” with the WL-COMETH and to relinquish this link in order to allow another client to call in the WL-COMETH.

If the client software crashes, it has no time to relinquish the link and the WL-COMETH keeps thinking that the link is established with a client that has disappeared. Now, if the client application is restarted and tries to connect, the WL-COMETH will reject the call because it thinks it’s already connected.

Two features of the WL-COMETH allow the management of such cases.

**Keep-alive:** This feature allows a WL-COMETH device to detect a possible loss of connection with the remote client, thus relinquishing the obsolete link and allowing a new connection request to be accepted.

When no data exchange takes place between the client and the WL-COMETH, the keep-alive feature will wait for a defined amount of time (say, the activation delay). Then it will probe the client several times, waiting a bit (say, the interval delay) between each probe for an answer from the client. If none of the probes is answered, the WL-COMETH closes the TCP connection. In the process, it may also drop control signals on the asynchronous serial port, depending on the serial dtr and rts settings.

The “set net keepalive...” and “show net keepalive...” series of commands allow you to set up this mechanism.

**Forced reconnection:** The 'reconnect' feature, (available in the servercom firmware only) as an alternative to the keep-alive mechanism, allows the WL-COMETH to accept unconditionally, at any time, a new connection request emanating from the same IP address as the currently opened connection (this one is then closed immediately).

The “set net reconnect...” and “show net reconnect...” series of commands allow you to set up this mechanism.

**Security note:** Although the “forced reconnection” method seems more attractive than keep-alive, it may lead to security weakness that should be carefully considered in sensitive environments (since connection request packets may be forged by a malevolent user on an open network, a denial of service to the legitimate user can be induced when this feature is used).

## X.4 Commands list

### General-purpose commands :

<b>login</b> <i>username</i>	start the administrator identification sequence. Ask password.
<b>save</b>	save the current configuration to the permanent configuration memory which is used after reboot and remains when the WL-COMETH is powered off.
<b>reset</b>	close the administration session and reboot the WL-COMETH, to ignore parameters changed but not saved, or to reload saved parameters.  The following parameters do not need a reset to take effect: location, id2217, showperm, netconfigperm, serial termtype, serial interface.
<b>quit</b>	close administration session (TELNET only).

### General parameters changes :

<b>set login</b> <i>username</i>	change administrator name. 8 bytes max. Upper and lower cases.
<b>set password</b> <i>password</i>	change administrator password. 8 bytes max. Upper and lower cases.
<b>set location</b> <i>location</i>	change location description. 30 bytes max. Upper and lower cases.
<b>set showperm allow</b> <b>set showperm deny</b>	allow or deny the right to display configuration information without entering the administrator password.
<b>set netconfigperm allow</b> <b>set netconfigperm deny</b>	allow or deny the right to use the administration system from the network.
<b>set upgradeperm allow</b> <b>set upgradeperm deny</b>	allow or deny the right to make an upgrade. If this flag is allowed, and you push admin switch to the ON position, upgrade is make through SLIP interface. This command is not valid in WL-COMETH version I.

### firmwares parameters changes :

(only in WL-COMETH version I. Else see [download firmware user guide\(DTUS040\).pdf](#))

<b>set prog enable</b> <i>Seg</i>	Enable firmware located in segment 'Seg'.
-----------------------------------	---

**Network parameters changes :**

**set net ethernet** *XX:XX:XX:XX:XX:XX*

change WL-COMETH Ethernet address. 6 hex digits separated by columns. DO NOT CHANGE if you don't know exactly the consequences.

**set net dhcp on**

**set net dhcp off**

These two commands turn on or off the DHCP client. When DHCP is on, the manually specified IP address is not used.

**set net dhcp clientid** *ident*

replace the standard client ID (MAC address as a string) by the custom string *ident*. 15 bytes max, upper and lower cases allowed.

**set net dhcp clientid**

delete the custom client ID and use the standard client ID.

**set net dhcp hname** *hostname*

provide the DHCP server with the supplementary Host Name option, with value *hostname*. 19 bytes max, no spaces allowed, upper and lower cases allowed.

**set net ip** *aaa.bbb.ccc.ddd*

change WL-COMETH IP address in dotted decimal notation.

**set net mask** *aaa.bbb.ccc.ddd*

change the subnet mask.

**set net gateway** *aaa.bbb.ccc.ddd*

change the default gateway IP address.

**set net metric** *mmm*

number of gateway hops. *mmm* is **1** to **255**.

**set net keepalive** *n t1 t2*

*n* defines the number of probes to send before closing the connection. *t1* defines the time in seconds before sending the first probe since the connection is inactive (the "activation delay" mentioned earlier). *t2* defines the time in seconds between each probes (the "interval delay" mentioned earlier). *n* ranges from 1 to 255. *t1* and *t2* range from 1 to 65535.

**set net keepalive 0 0 0**

disables use of the keep-alive feature.

**set net reconnect on**

**set net reconnect off**

These two commands turn on or off the "forced reconnection" feature.

**set net ssid** *SSID*

configures the case sensitive SSID of the WL-COMETH, which must be identical to the SSID of any interoperable WIFI equipment (access point, other computer...).

**Example:**

```
set net ssid acksys
```

This command sets the SSID of WL-COMETH to the value "acksys".

- set net mode *mode*** configures the WIFI mode. One of **ad-hoc** or **infra**.
- ad-hoc:** configures WL-COMETH in AD-HOC mode (see section AD-HOC network).
- Infra:** configures WL-COMETH in infrastructure mode (see section Infrastructure network).
- Example:**  
Set the WL-COMETH to ad-hoc mode.  
    set net mode ad-hoc  
Pass the WL-COMETH in infrastructure mode  
    set net mode infra
- set net channel *channel*** In ad-hoc mode, configures the channel used for communication with the other device. *channel* is in the range **0** to **13**. In infrastructure mode this parameter is ignored.
- set net wepkey *keynum key*** configures the WEP key in WL-COMETH.
- keynum* is the key number. Range **1** to **4**.
- key* is the key value. 64 bits key 16 or 10 digits) or 128 bits (32 or 26 digits).
- Example :**  
Set 64 bits WEP key :  
    set net wepkey 1 1F2564AE12  
Set 128 bits WEP key :  
    set net wepkey 1 123654875ADFEC236542541A26
- Note :** to enter a 128 bits WEP key, you must enable one 128 bits WEP key before. See command "set net usekey 1 128" below.
- set net wepkey *keynum 0*** when the key value is set to zero (one digit), deletes key number *keynum*.
- Example :**  
Clear WEP key :  
    set net wepkey 1 0

**set net usekey** *keynum* configures the WEP key used for transfer. If the *keynum* parameter is left empty, WL-COMETH won't use any WEP key.

**Example**

Activate 64 bits WEP key  
set net usekey 1

Activate 128 bits WEP key  
set net usekey 1 128

Disable WEP key in WL-COMETH  
set net usekey

**set net auth** *mode* Set the authentication mode. This command is not valid in WL-COMETH version I.

*Mode* is one of **Open**, **Share**

**Open** : The WL-COMETH is authenticated by its MAC address (default value).

**Share** : the WL-COMETH is authenticated by its WEP Key.

**Example**

set net auth share

configures the authentication by WEP key

**set net unencrypted** *mode* Configure if the device accept or ignore the unencrypted WIFI packet. This command is not valid in WL-COMETH version I.

*Mode* is one of **ignore** or **accept**

**Ignore** : The WL-COMETH ignore all WIFI packet unencrypted

**accept** : The WL-COMETH accept all WIFI packet unencrypted (default value).

**set net txrate** *txrate* sets the WIFI transmit rate. *txrate* is one of **1**, **2**, **5.5**, **11**, **automatic**.

**1**, **2**, **5.5** or **11**: WL-COMETH will always use the given transmit rate.

**automatic**: WL-COMETH will automatically choose the appropriate transmit rate.

**Setting/displaying a group of parameters :**

The following commands allow to retrieve and globally set the WL-COMETH configuration.

**Security note:** sensitive data, like login and password information, are conveyed in clear text by the following commands. You must take any step to protect these data from disclosure. As a basic protective step, the commands themselves can only be used by a logged-in operator.

**Usage note:** Some data conveyed by these commands should be kept unique to a WL-COMETH. This applies especially to the IP and MAC addresses in the ‘common’ parameters. You should either avoid to change this unique data or to restore them after using the ‘set’ commands.

**Usage note:** Some parameters take effect immediately, as specified elsewhere. Beware that the parameters you change do not affect the WL-COMETH at the moment you set them. For example, if you change the DHCP Client Id, this will take effect at the next lease expiration, which could happen soon. If you change the MAC address, it could adversely affect ARP responses if such a request is received. For these reasons a ‘set common’ command should be followed by a ‘save’ and a ‘reset’ command.

**set default** restore factory defaults, except the MAC address, the save count, the current firmware and the next firmware to run.

**set common** *offset hex:hex:hex...* insert the specified values in the data area which holds all the configuration parameters common to all firmwares in the WL-COMETH.

This command should be copied and pasted from the output of the corresponding ‘show’ command below. Its purpose is to copy exactly a WL-COMETH’s configuration in another one, or to restore a lost configuration.

**show common** *offset* display all the configuration parameters common to all firmwares in the WL-COMETH. *Offset* must be 0.

The purpose of this command is to display the ‘set common’ commands (see above) necessary to fully restore common parameters in a WL-COMETH.

**set local** *offset hex:hex:hex...* insert the specified values in the data area which holds all the configuration parameters specific to one of the firmwares in the WL-COMETH.

This command should be copied and pasted from the output of the corresponding ‘show’ command below. Its purpose is to copy exactly a WL-COMETH’s configuration in another one, or to restore a lost configuration.

BEWARE !

WL-COMETH version I: There are as many parameter sets as firmware segments in the FLASH EPROM. The same firmware can be downloaded in several segments in the WL-COMETH; for example for testing purpose. In this case there will be several parameter sets for this firmware.

WL-COMETH version II : There is only one set of local parameters, which is over written when a new firmware is downloaded in the WL-COMETH.

**show local** *offset* display all the configuration parameters specific to one of the firmwares in the WL-COMETH. *offset* must be 0.

The purpose of this command is to display the ‘set local’ commands (see above) necessary to fully restore common parameters in a WL-COMETH.

**Parameters display :**

Displaying the configuration parameters is allowed if the **showperm** parameter is set to « allow ». If it is set to « deny », the configuration parameters can only be displayed by the administrator after logging in.

Some parameters can be displayed for your information but cannot be changed.

**show version** firmware version  
**show location** physical location of the WL-COMETH  
**show showperm** is anybody allowed to display configuration ? **allowed / denied**  
**show netconfigperm** is it allowed to administer from the network ? **allowed / denied**  
**show upgradeperm** is WL-COMETH version II upgrade allowed? **allowed / denied**  
**show savecount** number of times the ‘save’ command has been used

**show net ethernet** assigned ethernet address  
**show net dhcp** DHCP use: on/off  
**show net dhcp clientid** value enforced on DHCP option 61, if any.  
**show net dhcp hname** value assigned to DHCP option 12, if any.  
**show net ip** assigned IP address  
**show net mask** local subnet mask  
**show net gateway** default gateway IP address  
**show net configport** administration port (telnet = 23)  
**show net txsize** max. size of sent frames  
**show net rxsize** max. size of received frames  
**show net metric** number of allowed gateway hops for outgoing traffic. **0-255**.  
**show net keepalive** keepalive parameters as **n probes, t1/t2 sec**; else “Keepalive off”.  
**show net reconnect** forced reconnection feature use: on/off  
**show net ssid** WL-COMETH’s SSID  
**show net wepkey** WEP key configured in WL-COMETH.

```
> show net wepkey
Wep key 1 :0215426584000000
Wep key 2 :AEFCD20489000000
Wep key 3 :25ADCF56CE000000
Wep key 4 :F8A2D25DF000000
Wep key used : 1 len 64 bits
Accept unencrypted data
```

Ignore last 6 digits.

The COMETH accepts the unencrypted data (This parameter is not showing in WL-COMETH version I.)

**show net wlan** configured and currently used values for the WIFI configuration (channel, txrate). For example:  
 AP density : High  
 tx rate : automatic/11 Mb  
 RF Signal quality : 100 %  
 Authentication type : open  
 Here the configured channel is 10, the channel in use is 1, the configured and currently used transfer rate are both 11 Mb/s.  
 The authentication mode is open. (This parameter is not showing in WL-COMETH version I.)

<b>show prog data</b> <i>Seg</i>	same, in computer-readable format.
<b>show prog list</b>	Display informations about all 6 firmwares, only on WL-COMETH version I.
<b>show prog enable</b>	Display the currently running firmware and the one that will run after the next reset.

## X.5 Factory settings common to all firmwares

<b>prog enable</b>	SERVERCOM firmware located in segment /2 Functionnalities : Raw TCP server, TELNET & TELNET 2217
<b>login</b>	root
<b>password</b>	root
<b>location</b>	unknown location
<b>showperm</b>	allowed
<b>netconfigperm</b>	allowed
<b>upgradeperm</b>	deny (only in WL-COMETH version II)
<b>net ethernet</b>	device serial number written on the label
<b>net dhcp</b>	off
<b>net dhcp hname</b>	empty (not sent)
<b>net dhcp clientid</b>	empty (MAC address sent as string)
<b>net ip</b>	192.168.1.253
<b>net mask</b>	255.255.255.0
<b>net gateway</b>	0.0.0.0 (no gateway/router)
<b>net configport</b>	23
<b>net txsize</b>	576
<b>net rxsize</b>	576
<b>net metric</b>	10
<b>net keepalive</b>	off
<b>net reconnect</b>	off
<b>net ssid</b>	acksys
<b>net channel</b>	10 in AD-HOC mode/automatic in infrastructure mode.
<b>net txrate</b>	automatic
<b>net wepkey</b>	wep key not used

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## XI ADDRESSING IN NETWORK PROTOCOLS

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### XI.1 TCP/IP network layers

TCP/IP is the name of the protocols used by Internet and many Intranets.

In a device participating in a TCP/IP network, there are four software layers: the **application layer**, the **transport layer** (TCP or UDP), the **network layer** (IP), the **LAN layer** (Ethernet, Wifi, point-to-point modems, etc.)

The **LAN layer address** allows a device to send data to another device connected to the same LAN. But there is not enough information in a LAN address to send to a device connected on another LAN through a router.

The **Network (IP) address** solves this problem by defining addresses which can be subject to routing. When the source and destination devices are not on the same LAN, the source device can send data to an intermediate gateway (also called router). The gateway has routing tables which allows it to forward data to the destination device, maybe through other gateways.

The **transport layer address**, called a “port”, is used inside a destination device to deliver data to the correct application process.

### XI.2 SSID

The SSID (Service Set Identifier), which is set on every wireless client and AP, defines the logical network for the group of wireless network devices that share that particular SSID. You can use any keyboard character to specify the SSID in WL-COMETH. SSID is **case sensitive**.

### XI.3 Ethernet Address

The Ethernet address is also referred to as the hardware address or MAC address. This address is assigned at the factory and should not be changed.

An Ethernet LAN can be made of hubs, switches, bridges, access points. These must not be confused with IP gateways (see below).

### XI.4 IP address

The IP address is a 4 bytes number unique to each device on the network, which hosts can use to communicate.

IP addresses can be private or public. Public addresses are reserved to devices that require to send data over a public network, such as internet. They are usually purchased or leased from a local ISP.

The IP address is usually represented in the “decimal dotted notation” which consists of the decimal value of each of the four bytes, separated by dots.

The IP address is divided into two parts : network and host. To support different needs, three network classes have been defined. In the following, ‘x’ stands for the host part of the IP address.

A host part with all bits set to 1 is the broadcast address, meaning for « for every device ».

A host part with all bits fixed to 0 addresses the network as a whole (for example, in routing entries).

Class A network : IP address 1.x.x.x to 127.x.x.x

The first byte defines the network and the last three bytes define the host.

Only 127 different class A networks exist, and each consist of up to 16.777.216 devices

Class B network : IP address 128.0.x.x to 191.255.x.x

The first two bytes define the network and the last two bytes define the host.

Class B networks are typically used for large company networks, and each can consist of up to 65,534 devices.

Class C network : IP address 192.0.0.x to 223.255.255.x

The first three bytes define the network and the last byte defines the host.

Class C networks are the most common and are often used in smaller company, and each network can consist of up to 254 devices.

More complex classes can be defined by manipulating the IP netmask associated with the IP address. See the [www.ietf.org](http://www.ietf.org) documentation.

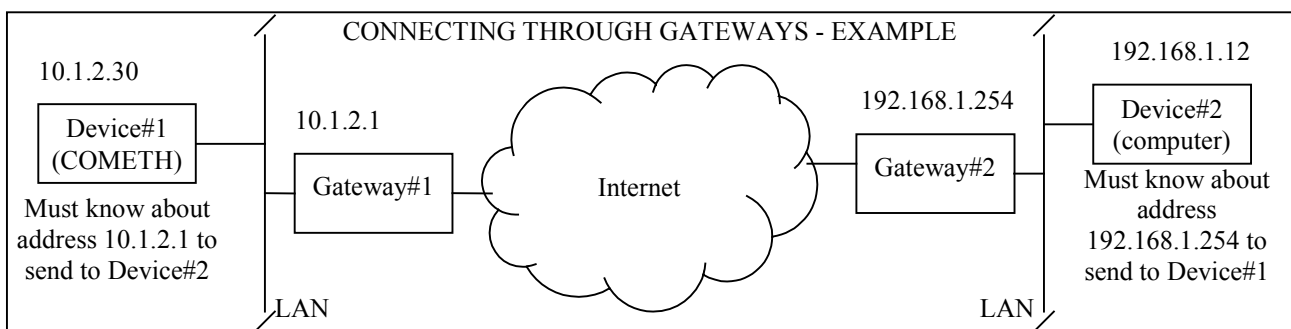
The bits set to one in the IP netmask define the bits of the associated IP address to be taken as the network part.

Network class	Network bits	Host bits	Netmask
A	8	24	255.0.0.0
B	16	16	255.255.0.0
C	24	8	255.255.255.0

Each COMETH has one user-assigned IP address. Its factory-assigned default value is the Class C address “192.168.1.253”.

## XI.5 Gateways

Each network device communicating through gateways MUST know the IP address of the gateway nearest to it. It will use this gateway to forward data to farther LANs. If a device does not know its gateway, it may receive data but may not return an answer. For example this can forbid answering a PING even if the PING request makes its way to the device.



## **XI.6 TCP port number**

Every TCP connection is defined by a source and destination IP address and port number. For example, a TELNET application commonly uses destination port number 23.

To support its two application processes, the COMETH, uses TCP port 23 to allow remote administration and one more TCP or UDP port, depending on the firmware, for data exchange with the asynchronous port.

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## XII REFERENCES

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COM port redirection

<http://www.ietf.org/rfc/rfc2217.txt>

DHCP

<http://www.ietf.org/rfc/rfc1541.txt>

<http://www.ietf.org/rfc/rfc2132.txt>

<http://www.ietf.org/rfc/rfc2134.txt>

<http://www.ietf.org/rfc/rfc2136.txt>

Keep-Alives

<http://www.ietf.org/rfc/rfc1122.txt>

ACKSYS documentations

For the latest versions please check the download section of <http://www.acksys.fr>

CD-ROM documentations:

[download firmware user guide\(DTUS040\).pdf](#) (only for WL-COMETH version I)

[SERVERCOM UserGuide \(DTUS043\).pdf](#)

[MODBUS-TCP UserGuide \(DTUS041\).pdf](#)

[MULTIPOINT UserGuide \(DTUS056\).pdf](#)

[TCPCLIENT UserGuide \(DTUS045\).pdf](#)

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