

# **LAN Adapter with Switch Function**

**CR-501**

**User Manual**

**Version 1.0**

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**Attention! The device cannot be used with communication lines having no lightning proofness and running outside the limits of one building**

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# 1. INTRODUCTION

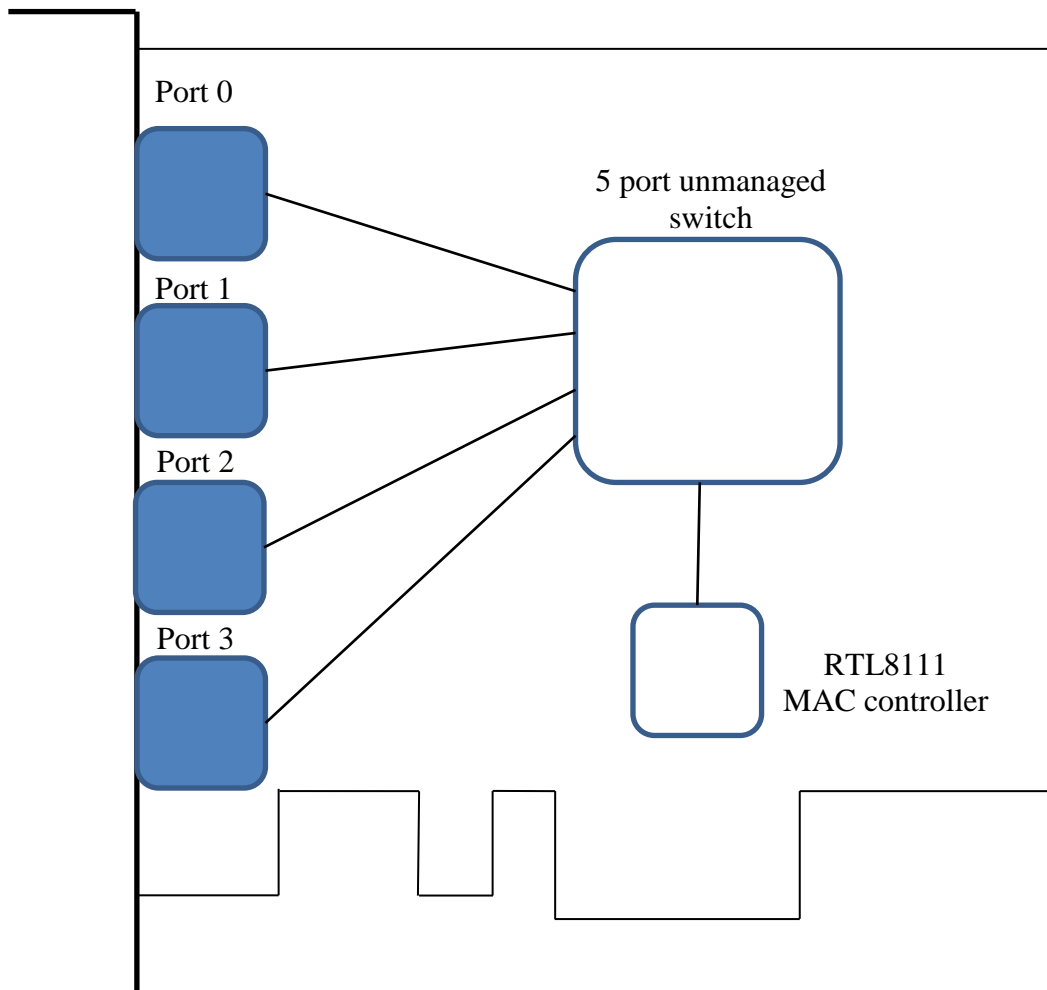
LAN adapter CR-501 is a combined device, which depending on configuration can perform one of three functions – multiport Ethernet adapter, embedded unmanaged switch as PC card or Ethernet tap.

The adapter has the following characteristics:

- Form factor – PC card PCI-express
- 4 external ports and one system port 10/100/1000 Base-T
- Full/Half duplex with flow control support IEEE 802.3x
- Support of jumbo frames of 9216 bytes
- Polarity and entangled pairs self-correction
- Support of Wake-on-LAN
- Microsoft NDIS5 checksum offload (IP,TCP,UDP)
- Support of IEEE 802.1Q VLAN
- Support of Spanning Tree IEEE 802.1w, IEEE802.1s

## 2. ADAPTER STRUCTURE

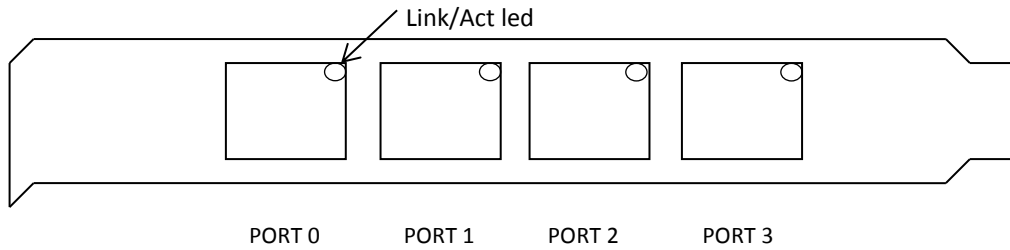
The adapter structure is shown in the picture.



The device is based on 5-port switch RTL8367, which ports 0-3 are located on the PC board front panel. Port 4 of the switch is connected to MAC controller RTL8111. MAC controller performs LAN interface functions via PCI-express bus. Accordingly, from the system point of view the device is a mere Ethernet adapter.

### 3. CONNECTING ADAPTER BOARD

The following is the picture of the front panel of adapter CR-501 and the table of the ports connection.

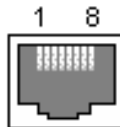


Output	1	2	3	4	5	6	7	8
Destination	A+	A-	B+	C+	C-	B-	D+	D-

Notes.

1. A,B,C,D – duplex twisted-pair wires
2. Standard 10/100 uses pair A for transmission and pair B for receipt
3. LINK/ACT LED – signal presence and packet transmission/receipt indicator

Used connection type RJ-45

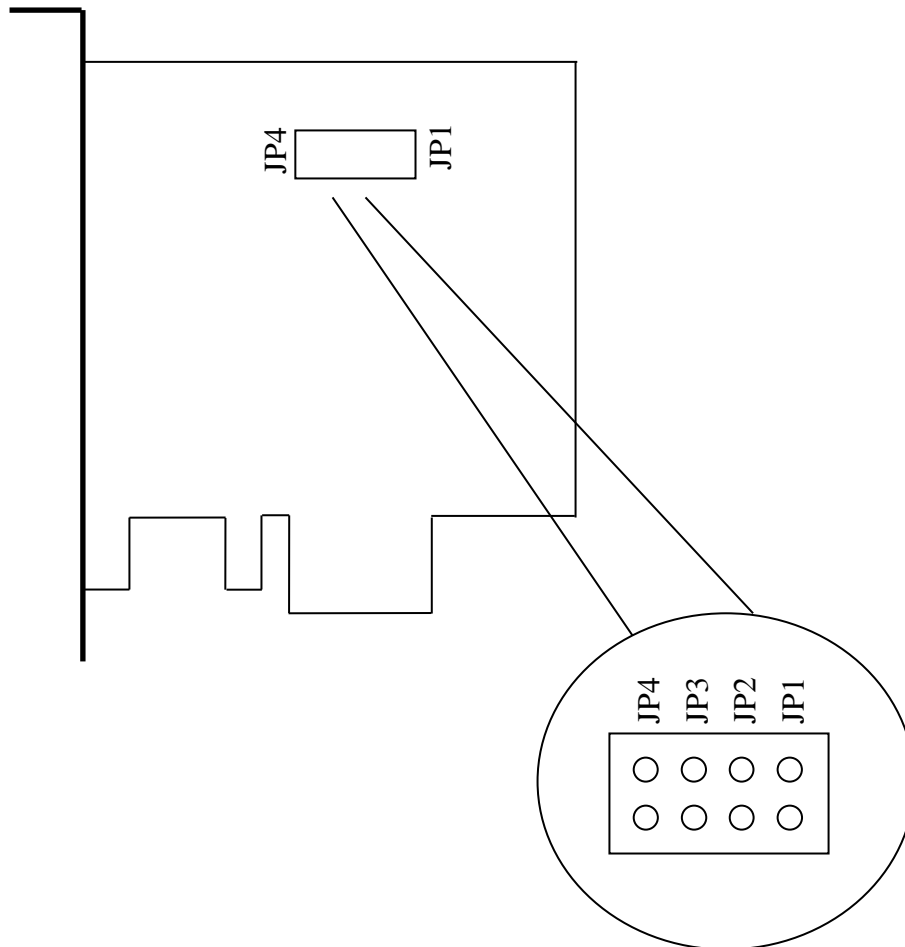




## 4. DEVICE CONFIGURATION

### 4.1. MODE SELECTION

The mode is selected with the help of jumpers on board (see the picture).



The mode dependence on jumpers position is shown in the table below. On – the jumper is closed, Off – the jumper is open, X – the position is ignored.

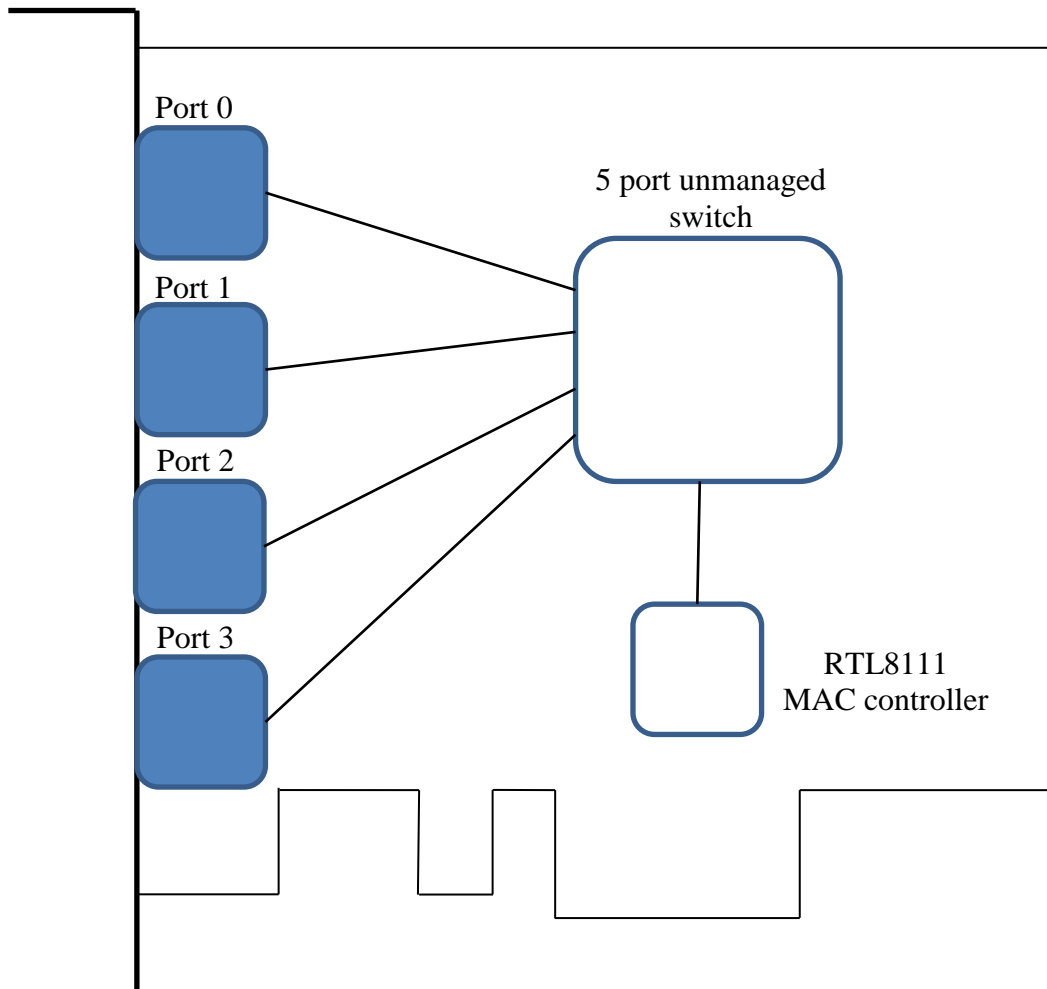
<b>JP4</b>	<b>JP3</b>	<b>JP2</b>	<b>JP1</b>	<b>Mode</b>
Off	Off	X	X	5-port unmanaged switch

Off	On	X	X	Ethernet tap
On	X	Off	Off	4-port MAC controller, VID=200
On	X	Off	On	4-port MAC controller, VID=300
On	X	On	Off	4-port MAC controller, VID=400
On	X	On	On	4-port MAC controller, VID=500

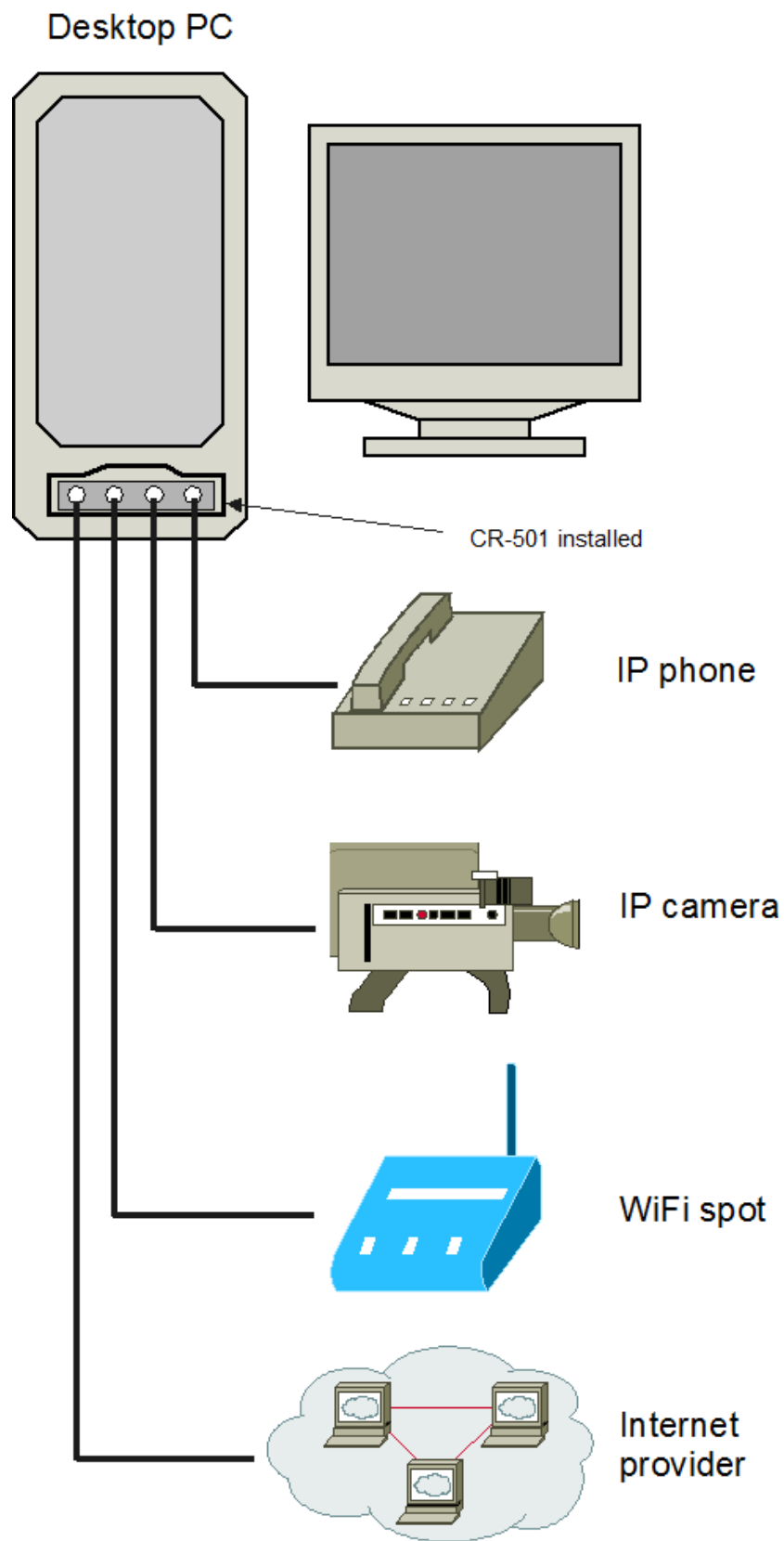
VID – internal VLAN identifier (see mode description).

#### 4.2. UNMANAGED SWITCH MODE

This mode uses the device as a 5-port switch embedded to PC. The fifth port of the switch is connected to the MAC controller and can be accessed via PCI-express bus.

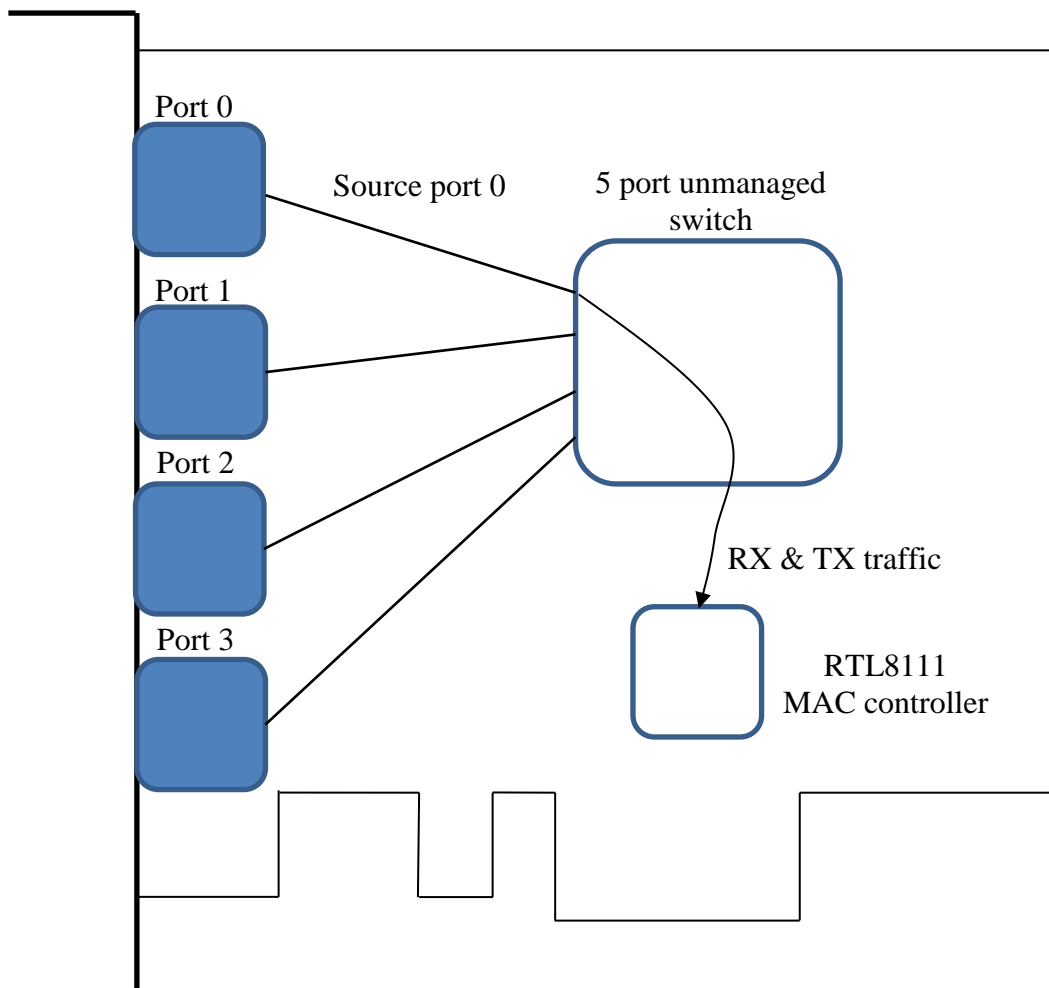


The example of the device operation in this mode is shown in the picture below. In this example, the adapter is used to connect desktop devices to a personal computer. Thus, the desktop switch, its power block can be avoided and the number of patch cords can be minimized.



### 4.3. ETHERNET TAP MODE

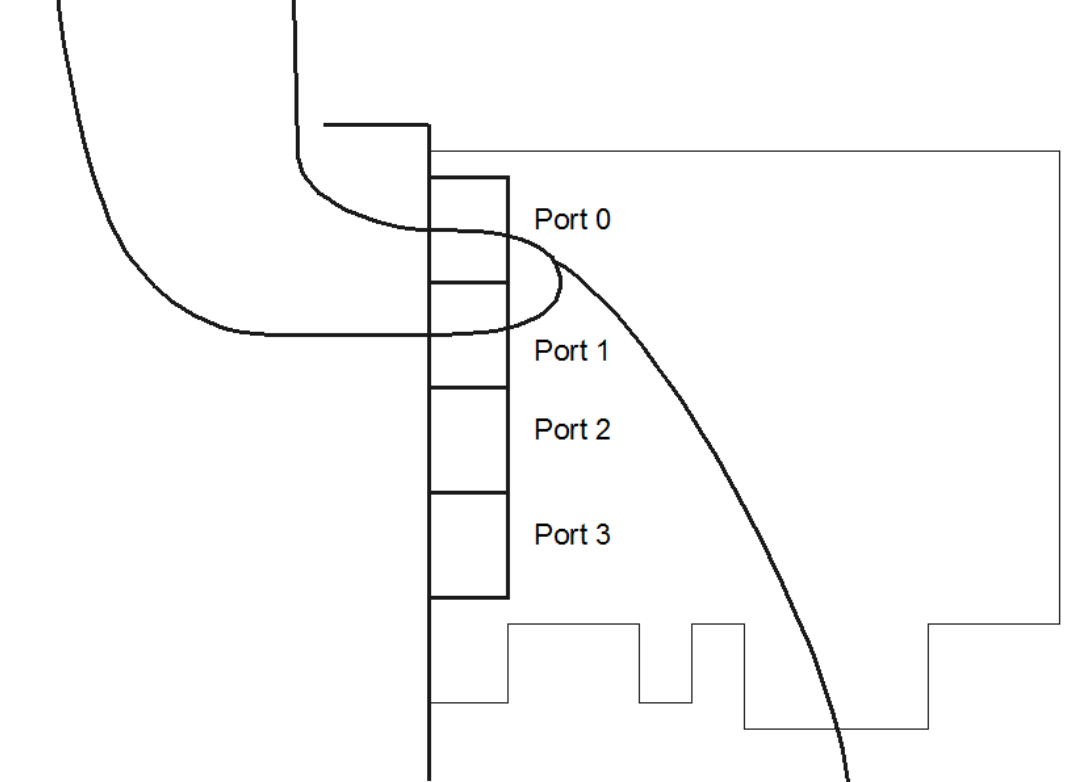
In this mode the device still functions as a switch, but port 0 and port 4 (system) perform special functions. They can connect a peripheral device with traffic to analyze to port. Using ports 1-3 the device to be analyzed will carry out outward communication. But the packets sent or received via port 0 will be copied to port 4 and sent to the MAC controller. With the help of a network analyzer these packets can be recorded and analyzed.



The example of the Ethernet tap mode performance is shown in the picture below.

Peer device

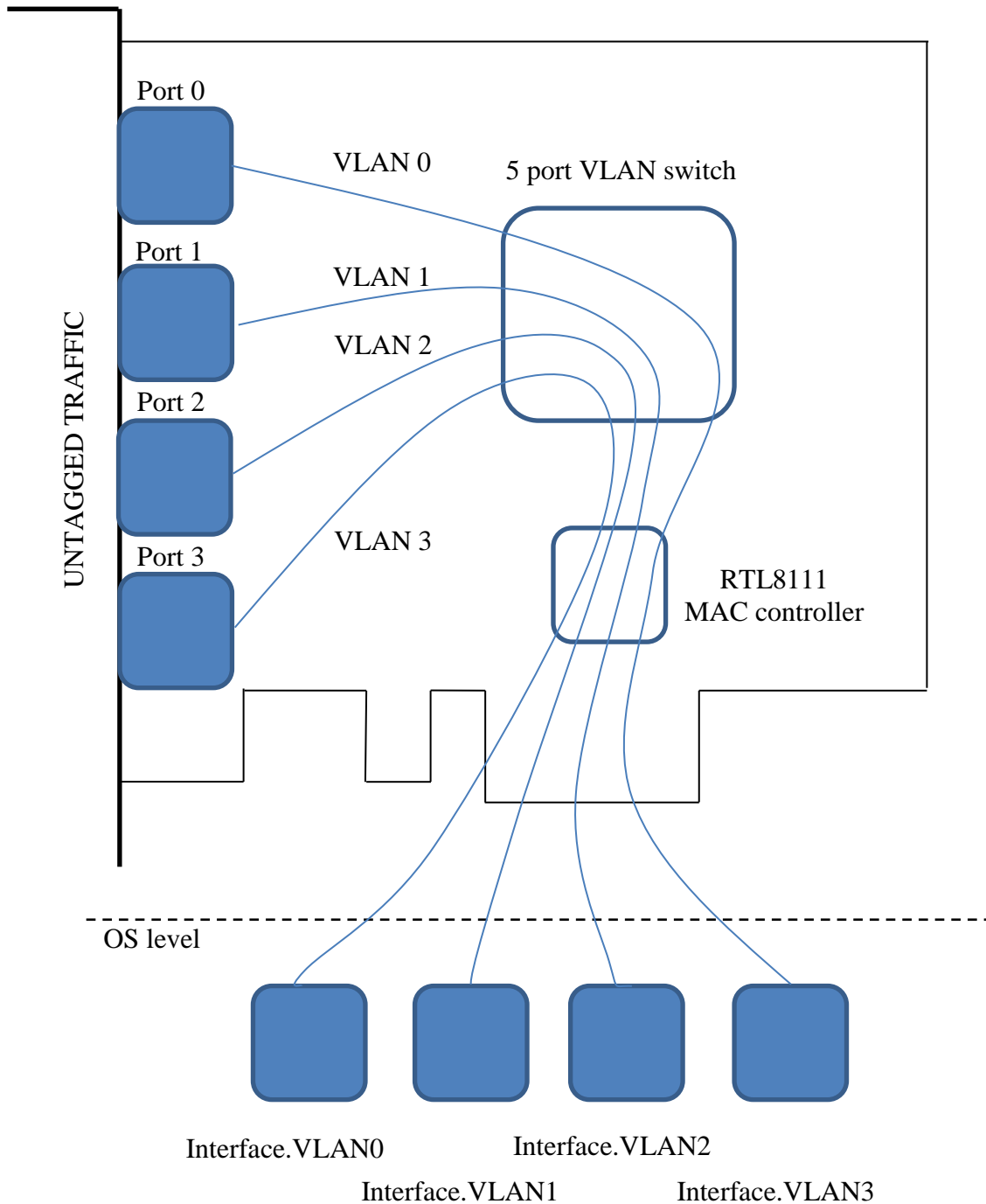
Monitored device



tcpdump, wireshark

#### 4.4. 4-PORT MAC CONTROLLER MODE

This mode assigns an internal VLAN to each external port of the adapter. Thus, the switch isolates the traffic between ports. The traffic from every external port is closed to the MAC controller only.



It shall be noted that in external ports the packets are not tagged, but in the MAC controller the packets from port  $n$  have  $VID+n$  tag where VID stands for the number given by jumper

configuration. When making the board driver configuration in an operational system one shall make a virtual Ethernet adapter corresponding this VLAN number.

Let us show it in an example.

Given the board with JP4=On, JP2=Off, JP1=On. Then port 0 is assigned VLAN number 300, port 1 - VLAN 301, port 2 – VLAN 302, port 3 – VLAN 303.

We assume that Linux system is used and adapter CR-501 is given name eth5. The following commands shall be made in Linux console.

```
# ifconfig eth5 up  
  
#vconfig add eth5 300  
  
#vconfig add eth5 301  
  
#vconfig add eth5 302  
  
#vconfig add eth5 303  
  
#ifconfig eth5.300 192.168.30.1 netmask 255.255.255.0  
  
#ifconfig eth5.301 192.168.31.1 netmask 255.255.255.0  
  
#ifconfig eth5.302 192.168.32.1 netmask 255.255.255.0  
  
#ifconfig eth5.303 192.168.33.1 netmask 255.255.255.0
```

As a result

port 0 will be available via interface eth5.300 with IP address 192.168.30.1,

port 1 will be available via interface eth5.301 with IP address 192.168.31.1,

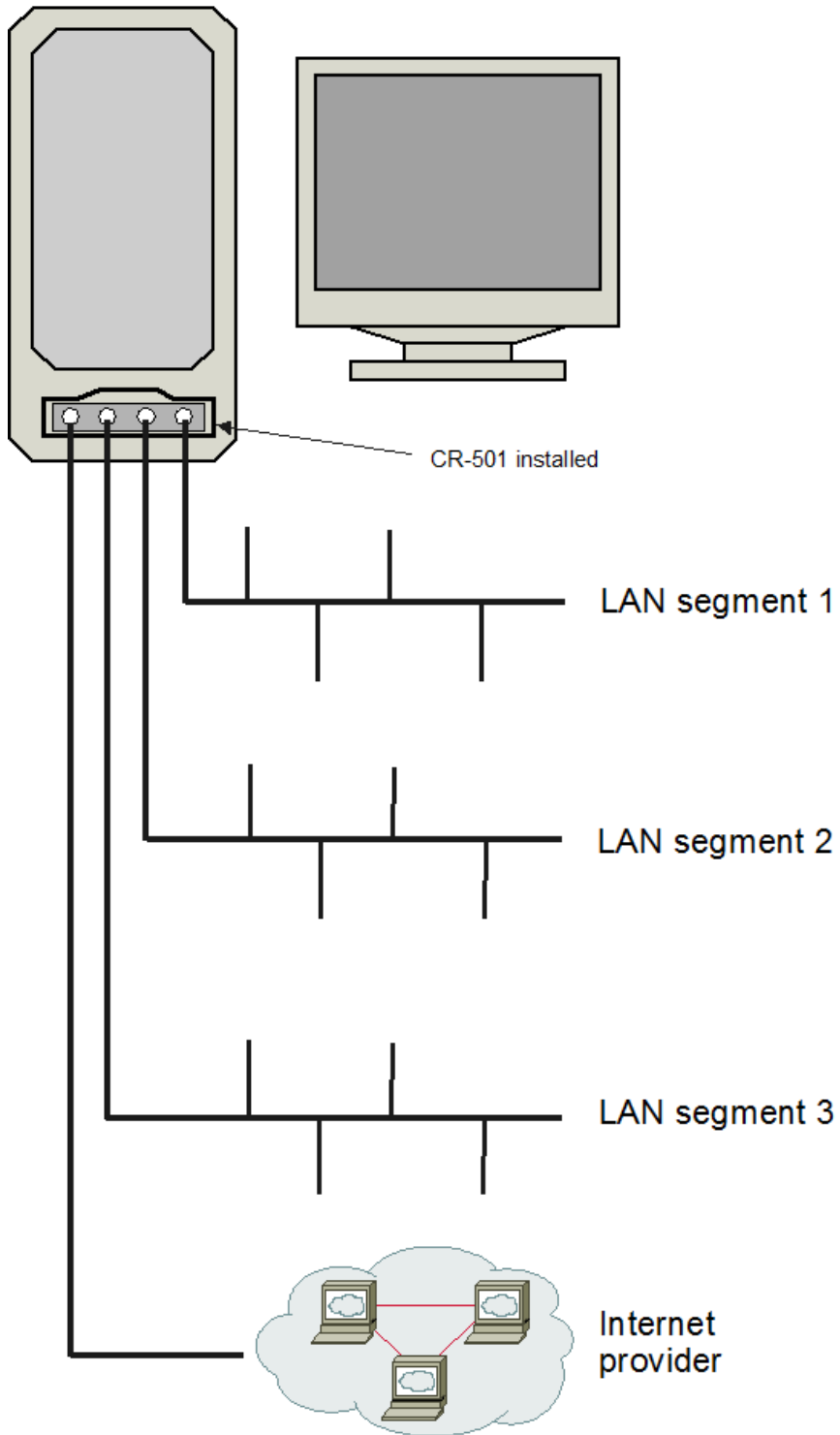
port 2 will be available via interface eth5.302 with IP address 192.168.32.1,

port 3 will be available via interface eth5.303 with IP address 192.168.33.1.

The example of the adapter performance as a 4-port controller can be found in the picture.



Office server with firewall, router, etc



## 5. SCOPE OF SUPPLY

- Adapter board
- CD with user's manual
- Certificate of warranty
- Packing box sized 26x17x3 cm

The set weight is not over 0.5 kg.



