EPS易普森

User Manual

SK202 – Contactless GbE

1. Overview

This document guides users how to use the SK202A/B modules. The pair of modules transmits Gigabit Ethernet signals at a distance of several centimeters in a contactless way. SK202 opens a new scene for network connection applications. This module integrates a network PHY chip and ST60 A2, a millimeter wave wireless transceiver chip, which can be simply connected to the existing Ethernet replacing a network cable. Please note is that both SK202 modules must at the same speed mode as described in section 3 of this document.
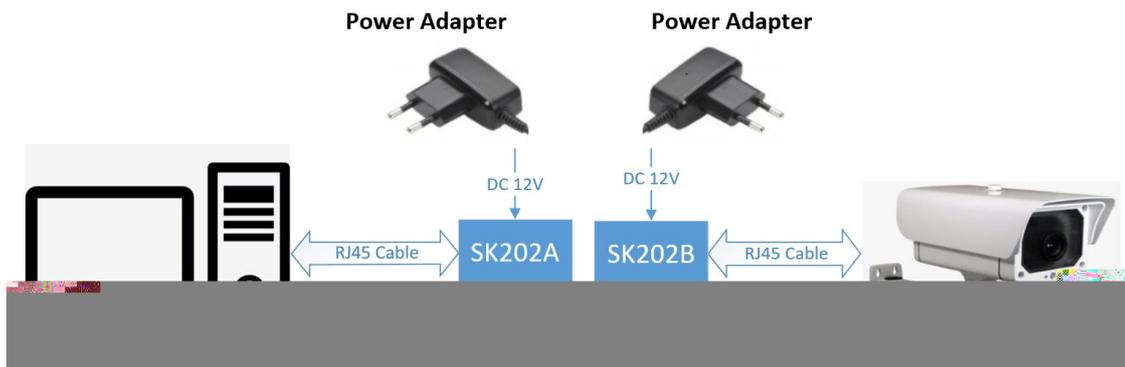
2. Connection method

Figure 1.   Schematic diagram of using SK202 to connect IP camera

SK202 only needs to be connected to the network and power supply, but it should be noted that the network negotiation rate of the PC side and the router side are the same. If the PC side is a gigabit network, the rate automatically negotiated with the SK202A will be 1G. Then the rate on the router side must be 1Gbps, and the router will automatically negotiate the rate with the SK202B to be 1Gbps. The network will be connected, working on Gigabit Ethernet.

Assuming that the router has a rate of 100M, SK202B will negotiate a rate of 100M with the router. At this time, the rate of SK202A is 1Gbps, and the rates of SK202A/B are inconsistent, and the network will not work. Please refer to section 'Controlled Auto-negotiation' below.

The category of the cables used to connect the modules to the rest of the network must be compatible with the rate that will be negotiated. 10/100 or 1000Mbps.Please note that SK202A and SK202B must be used in pairs, and the golden antenna part needs to be aligned with a distance of about 3cm.

Figure 2. Physical picture of SK202 non-contact connector

3. Controlled Auto-negotiation

The Network PHY chip embedded in the SK202 is set in Auto-negotiation mode and is able to support 10/100/1000Mbps. In order for the SK202A and SK202B to communicate they must operate at the same speed. The Green LED on the RJ45 connector of blinks when a 1Gbps communication is established between the local and the distant PHY. The Orange LEDs blinks when the communication is at 10Mbps

The PHYs on the SK202 work independently and each one negotiates automatically with the device it is connected to. So two independent negotiations take place in parallel.

As a consequence, if the two devices, such as a laptop and a camera, advertise different maximum speeds, the two auto-negotiation results will differ.
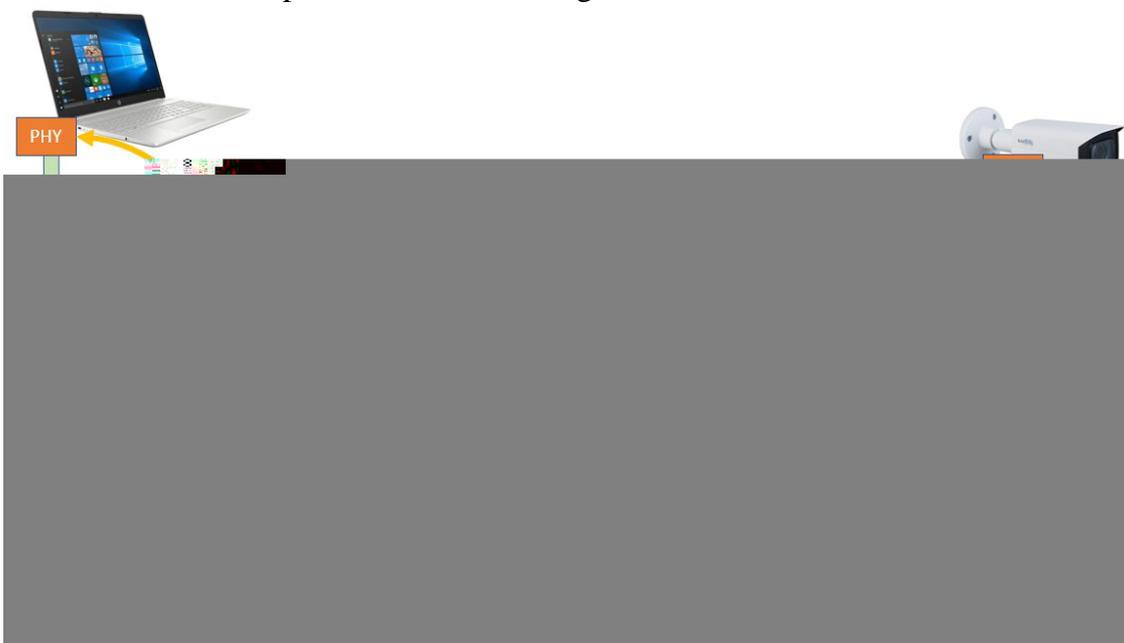
Figure 3. Non controlled auto-negotiation may fail

For the SK202 communication to establish correctly between devices advertising different maximum speed capabilities, the auto-negotiation of the fastest device has to be controlled.

Thanks to the controlled auto-negotiation on the laptop, one can ensure the link with the SK202 will be set up at the same speed than the one between the second SK202 and the camera.
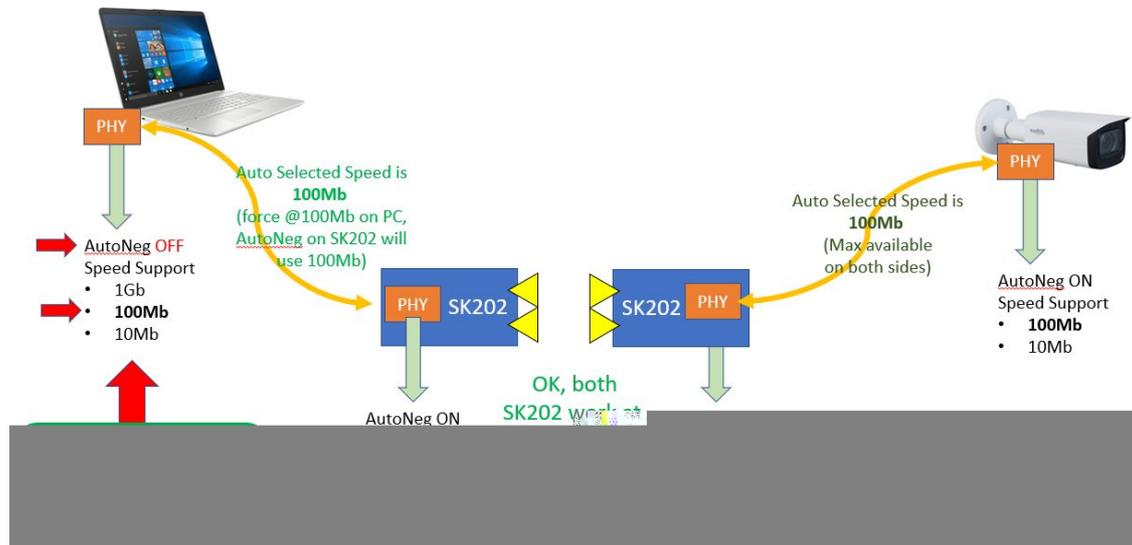

Figure 4.   Controlled auto-negotiation is required when the 2 devices do not advertise the same maximum speed capability

Alternatively, one can introduce a switch operating at the same speed than the slowest device in order to ensure the auto-negotiation result will be the same on both sides.
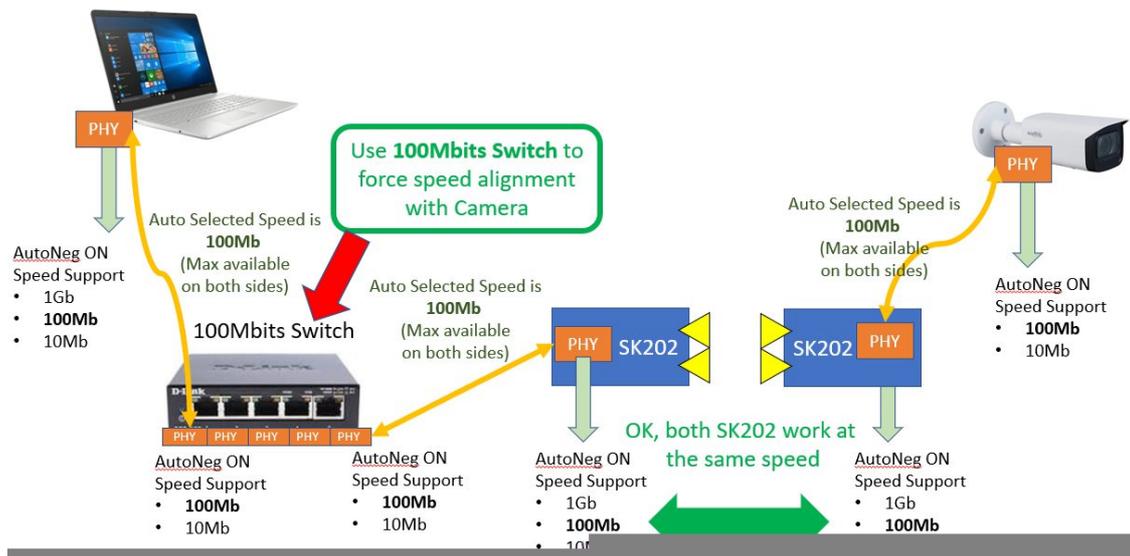

Figure 5.   Auto-negotiation result controlled using a switch.

4. Performance evaluation method

If you need to evaluate the impact of SK202 on network transmission, it is recommended to use a third-party tool IPERF3. Only need two network cable and two

PCs to complete the test. You can download from the address as below:

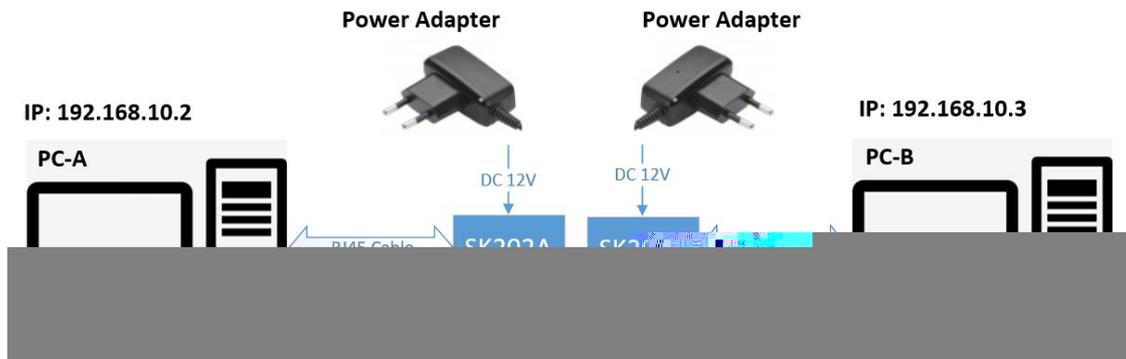https://iperf.fr/iperf-download.php

Iperf3 test method:

Figure 6.   Iperf3 test Schematic diagram with SK202

Refer to the figure 6 to connect to the network. The network adapters of two PCs need the same speed, such as Gigabit Ethernet controller. IP address of PC-A is set to 192.168.10.2, IP address of PC-B is set to 192.168.10.3. Please use at least Cat5e-type cable for testing

PC-A as a server, run command: `iperf3 --server`

PC-B as client, run command: `iperf3 --udp --bandwidth 1G --client 192.168.10.2 --time 100 --len 63k`

IPERF3 will test 100 seconds through UDP protocol with 1G bandwidth, and there will be BER and jitter result output as the blow picture.

At server side:

```
- - - - - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval         Transfer    Bandwidth     Jitter     Lost/Total Datagrams
[  5]   0.00-100.0
```

At client side:

```
- - - - - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer    Bandwidth     Jitter     Lost/Total Datagrams
[  4]   0.00-100.00 sec  11.1 GBytes  954 Mbits/sec  0.099 ms  0/184761 (0%)
[  4] Sent 184761 datagrams

iperf Done.
```

If you care about the output of iperf3 test, a comparison test is necessary. You can change the SK202 modules to a RJ45 connector to directly connect two PCs, and use the same command for comparison test.
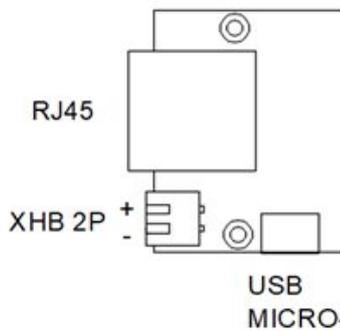
Figure 7.

5. Environment constr

For the RF waves to propa

with ABS or other microwave insensitive materials to maintain water tightn
opening should follow these guidelines:

· The casing must be placed at around 2.7mm from the PCB to ensure a
  space of 0.8mm between the Horn antennae body and the ABS housin
· The opening should be minimum 22 mm long and 9 mm wide, centere
  antennae, but it can be enlarged.
· Should the casing be placed further away and the
  dimensions will have to l

This is summarized in the

RJ45

XHB 2P +
        -

USB
MICRO

Figu

Date	Version
NOV 2 2020	1.0