# MOXA C101 Synchronous Interface

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This document applies to V3.0

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## General Information

### Summary

The MikroTik RouterOS supports MOXA C101 Synchronous 4Mb/s Adapter hardware. The V.35 synchronous interface is the standard for VSAT and other satellite modems. However, you must check with the satellite system supplier for the modem interface type.

### Specifications

Packages required: ***synchronous***
License required: ***level4***
Home menu level: ***/interface moxa-c101***
Standards and Technologies: ***Cisco/HDLC-X.25 (RFC 1356)***, ***Frame Relay (RFC1490)***, ***PPP (RFC-1661)***, ***PPP (RFC-1662)***
Hardware usage: ***Not significant***

### Description

You can install up to four MOXA C101 synchronous cards in one PC box, if you have so many slots and IRQs available. Assuming you have all necessary packages and licenses installed, in most cases it should to be done nothing at that point (all drivers are loaded automatically). However, if you have a non Plug-and-Play ISA card, the corresponding driver requires to be loaded.

### MOXA C101 PCI variant cabling

The MOXA C101 PCI requires different from MOXA C101 ISA cable. It can be made using the following table:

| DB25f | Signal | Direction | V.35m |
|---|---|---|---|
| **4** | **RTS** | **OUT** | **C** |
| **5** | **CTS** | **IN** | **D** |
| **6** | **DSR** | **IN** | **E** |
| **7** | **GND** | **-** | **B** |
| **8** | **DCD** | **IN** | **F** |
| **10** | **TxDB** | **OUT** | **S** |
| **11** | **TxDA** | **OUT** | **P** |
| **12** | **RxDB** | **IN** | **T** |
| **13** | **RxDA** | **IN** | **R** |
| **14** | **TxCB** | **IN** | **AA** |
| **16** | **TxCA** | **IN** | **Y** |
| **20** | **DTR** | **OUT** | **H** |
| **22** | **RxCB** | **IN** | **X** |
| **23** | **RxCA** | **IN** | **V** |
| **short 9 and 25 pin** | | | |

## Additional Documents

For more information about the MOXA C101 synchronous 4Mb/s adapter hardware please see:

- http://www.moxa.com/product/sync/C101.htm - the product on-line documentation
- C101 SuperSync Board User's Manual the user's manual in PDF format

# Synchronous Interface Configuration

Home menu level: ***/interface moxa-c101***

## Description

Moxa c101 synchronous interface is shown under the interfaces list with the name moxa-c101-N

## Property Description

**cisco-hdlc-keepalive-interval** (*time*; default: **10s**) - keepalive period in seconds
**clock-rate** (*integer*; default: **64000**) - speed of internal clock

**clock-source** (*external* | *internal* | *tx-from-rx* | *tx-internal*; default: **external**) - clock source

**frame-relay-dce** (*yes* | *no*; default: **no**) - operate or not in DCE mode

**frame-relay-lmi-type** (*ansi* | *ccitt*; default: **ansi**) - Frame-relay Local Management Interface type:

- **ansi** - set LMI type to ANSI-617d (also known as Annex A)
- **ccitt** - set LMI type to CCITT Q933a (also known as Annex A)

**ignore-dcd** (*yes* | *no*; default: **no**) - ignore or not DCD

**line-protocol** (*cisco-hdlc* | *frame-relay* | *sync-ppp*; default: **sync-ppp**) - line protocol name

**mtu** (*integer*; default: **1500**) - Maximum Transmit Unit

**name** (*name*; default: **moxa-c101-N**) - interface name

## Notes

If you purchased the MOXA C101 Synchronous card from MikroTik, you have received a V.35 cable with it. This cable should work for all standard modems, which have V.35 connections. For synchronous modems, which have a DB-25 connection, you should use a standard DB-25 cable.

The MikroTik driver for the MOXA C101 Synchronous adapter allows you to unplug the V.35 cable from one modem and plug it into another modem with a different clock speed, and you do not need to restart the interface or router.

## Example

```
[admin@MikroTik] interface> moxa-c101
[admin@MikroTik] interface moxa-c101> print
Flags: X - disabled, R - running
  0  R name="moxa-c101-1" mtu=1500 line-protocol=sync-ppp clock-rate=64000
       clock-source=external frame-relay-lmi-type=ansi frame-relay-dce=no
       cisco-hdlc-keepalive-interval=10s ignore-dcd=no
[admin@MikroTik] interface moxa-c101>
```

You can monitor the status of the synchronous interface:

```
[admin@MikroTik] interface moxa-c101> monitor 0
    dtr: yes
    rts: yes
    cts: no
    dsr: no
    dcd: no
[admin@MikroTik] interface moxa-c101>
```

Connect a communication device, e.g., a baseband modem, to the V.35 port and turn it on. If the link is working properly the status of the interface is:

```
[admin@MikroTik] interface moxa-c101> monitor 0
    dtr: yes
    rts: yes
    cts: yes
    dsr: yes
    dcd: yes
[admin@MikroTik] interface moxa-c101>
```

# Troubleshooting

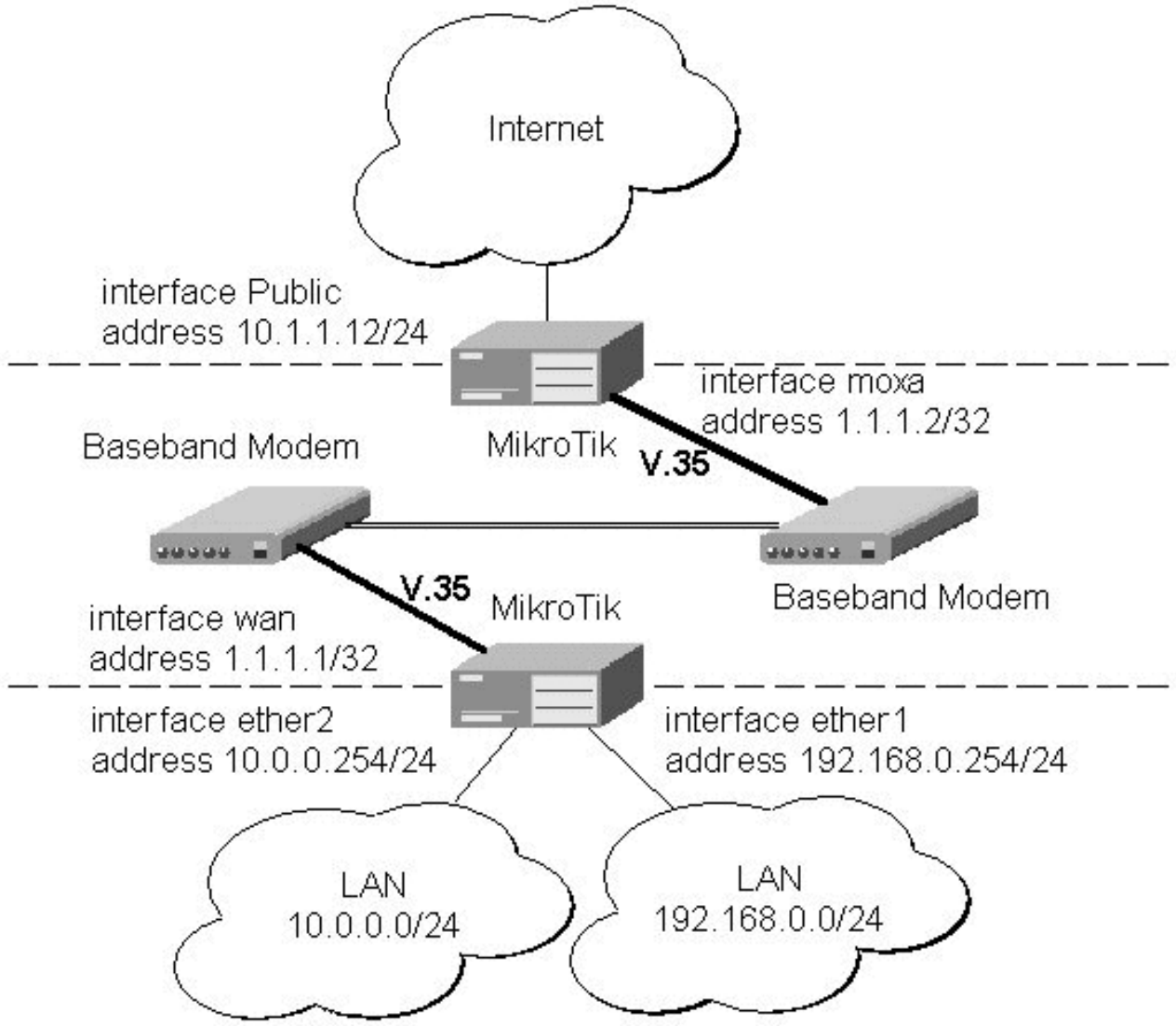
## Description

- **The synchronous interface does not show up under the interfaces list**
  Obtain the required license for synchronous feature
- **The synchronous link does not work**
  Check the V.35 cabling and the line between the modems. Read the modem manual

# Synchronous Link Application Examples

## MikroTik Router to MikroTik Router

Let us consider the following network setup with two MikroTik Routers connected to a leased line with baseband modems:




The driver for MOXA C101 card should be loaded and the interface should be enabled according to the

instructions given above. The IP addresses assigned to the synchronous interface should be as follows:

```
[admin@MikroTik] ip address> add address=1.1.1.1/32 interface=wan \
\... network=1.1.1.2 broadcast=255.255.255.255

[admin@MikroTik] ip address> print
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   10.0.0.254/24      10.0.0.254      10.0.0.255      ether2
  1   192.168.0.254/24   192.168.0.254   192.168.0.255   ether1
  2   1.1.1.1/32         1.1.1.2         255.255.255.255 wan
[admin@MikroTik] ip address> /ping 1.1.1.2
1.1.1.2 64 byte ping: ttl=255 time=31 ms
1.1.1.2 64 byte ping: ttl=255 time=26 ms
1.1.1.2 64 byte ping: ttl=255 time=26 ms
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 26/27.6/31 ms
[admin@MikroTik] ip address>
```

The default route should be set to the gateway router 1.1.1.2:

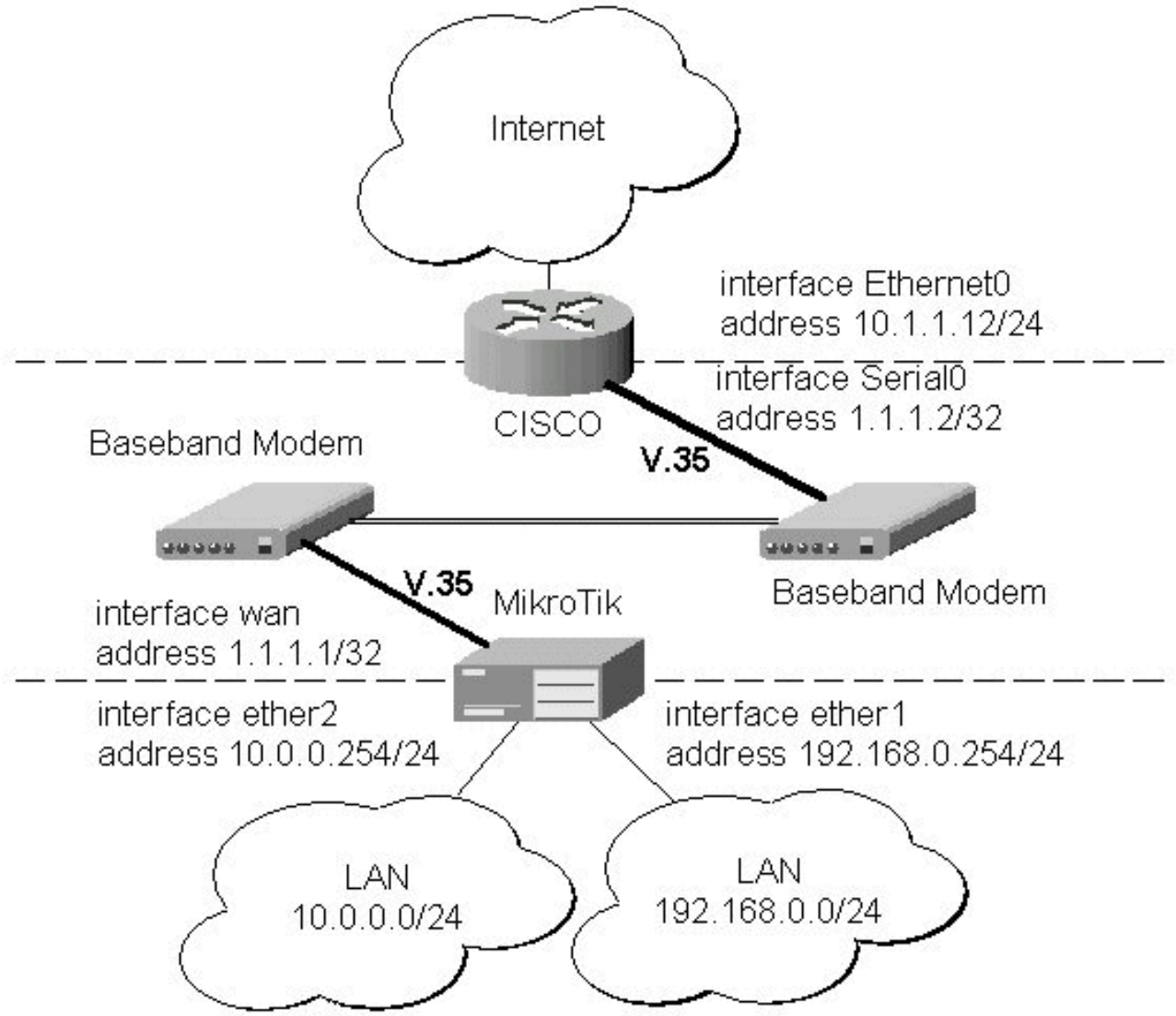
```
[admin@MikroTik] ip route> add gateway 1.1.1.2
[admin@MikroTik] ip route> print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
 #      DST-ADDRESS        PREF-SRC        G GATEWAY         DISTANCE INTER...
 0 A S  0.0.0.0/0                          r 1.1.1.2         1        wan
 1 ADC  10.0.0.0/24        10.0.0.254      r                 0        ether2
 2 ADC  192.168.0.0/24     192.168.0.254   r                 0        ether1
 3 ADC  1.1.1.2/32         1.1.1.1         r                 0        wan
[admin@MikroTik] ip route>
```

The configuration of the MikroTik router at the other end is similar:

```
[admin@MikroTik] ip address> add address=1.1.1.2/32 interface=moxa \
\... network=1.1.1.1 broadcast=255.255.255.255
[admin@MikroTik] ip address> print
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   10.1.1.12/24       10.1.1.12       10.1.1.255      Public
  1   1.1.1.2/32         1.1.1.1         255.255.255.255 moxa
[admin@MikroTik] ip address> /ping 1.1.1.1
1.1.1.1 64 byte ping: ttl=255 time=31 ms
1.1.1.1 64 byte ping: ttl=255 time=26 ms
1.1.1.1 64 byte ping: ttl=255 time=26 ms
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 26/27.6/31 ms
[admin@MikroTik] ip address>
```

## MikroTik Router to Cisco Router

Let us consider the following network setup with MikroTik Router connected to a leased line with baseband modems and a CISCO router at the other end:




The driver for MOXA C101 card should be loaded and the interface should be enabled according to the instructions given above. The IP addresses assigned to the synchronous interface should be as follows:

```
[admin@MikroTik] ip address> add address 1.1.1.1/32 interface wan \
\... network 1.1.1.2 broadcast 255.255.255.255
[admin@MikroTik] ip address> print
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   10.0.0.254/24      10.0.0.254      10.0.0.255      ether2
  1   192.168.0.254/24   192.168.0.254   192.168.0.255   ether1
  2   1.1.1.1/32         1.1.1.2         255.255.255.255 wan
[admin@MikroTik] ip address> /ping 1.1.1.2
1.1.1.2 64 byte ping: ttl=255 time=31 ms
1.1.1.2 64 byte ping: ttl=255 time=26 ms
1.1.1.2 64 byte ping: ttl=255 time=26 ms
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 26/27.6/31 ms
[admin@MikroTik] ip address>
```

The default route should be set to the gateway router 1.1.1.2:

```
[admin@MikroTik] ip route> add gateway 1.1.1.2
[admin@MikroTik] ip route> print
Flags: X - disabled, A - active, D - dynamic,
```

```
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
 #      DST-ADDRESS        PREF-SRC        G GATEWAY         DISTANCE INTER...
 0 A S  0.0.0.0/0                          r 1.1.1.2         1        wan
 1 ADC  10.0.0.0/24        10.0.0.254      r                 0        ether2
 2 ADC  192.168.0.0/24     192.168.0.254   r                 0        ether1
 3 ADC  1.1.1.2/32         1.1.1.1         r                 0        wan
[admin@MikroTik] ip route>
```

The configuration of the Cisco router at the other end (part of the configuration) is:

```
CISCO#show running-config
Building configuration...

Current configuration:
...
!
interface Ethernet0
 description connected to EthernetLAN
 ip address 10.1.1.12 255.255.255.0
!
interface Serial0
 description connected to MikroTik
 ip address 1.1.1.2 255.255.255.252
 serial restart-delay 1
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.1.1.254
!
...
end

CISCO#
```

Send ping packets to the MikroTik router:

```
CISCO#ping 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/32/40 ms
CISCO#
```

**Note!** Keep in mind that for the point-to-point link the network mask is set to **32** bits, the argument **network** is set to the IP address of the other end, and the broadcast address is set to **255.255.255.255**.