# FarSync X.21 Interface

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This document applies to V3.0

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## General Information

### Summary

The MikroTik RouterOS supports FarSync T-Series X.21 synchronous adapter hardware. These cards provide versatile high performance connectivity to the Internet or to corporate networks over leased lines.

### Specifications

Packages required: ***synchronous***
License required: ***level4***
Home menu level: ***/interface farsync***
Standards and Technologies: ***X.21, Frame Relay, PPP***
Hardware usage: ***Not significant***

### Additional Documents

- http://www.farsite.co.uk/

## Synchronous Interface Configuration

Home menu level: ***/interface farsync***

### Description

You can change the interface name to a more descriptive one using the **set** command. To enable the interface, use the **enable** command.

## Property Description

**clock-rate** (*integer*; default: **64000**) - the speed of internal clock
**clock-source** (*external* | *internal*; default: **external**) - clock source
**disabled** (*yes* | *no*; default: **yes**) - shows whether the interface is disabled
**frame-relay-dce** (*yes* | *no*; default: **no**) - operate in Data Communications Equipment mode
**frame-relay-lmi-type** (*ansi* | *ccitt*; default: **ansi**) - Frame Relay Local Management Interface type
**hdlc-keepalive** (*time*; default: **10s**) - Cisco HDLC keepalive period in seconds
**line-protocol** (*cisco-hdlc* | *frame-relay* | *sync-ppp*; default: **sync-ppp**) - line protocol
**media-type** (*V24* | *V35* | *X21*; default: **V35**) - type of the media
**mtu** (*integer*; default: **1500**) - Maximum Transmit Unit
**name** (*name*; default: **farsyncN**) - assigned interface name

## Example

```
[admin@MikroTik] interface farsync> print
Flags: X - disabled, R - running
  0    name="farsync1" mtu=1500 line-protocol=sync-ppp media-type=V35
       clock-rate=64000 clock-source=external chdlc-keepalive=10s
       frame-relay-lmi-type=ansi frame-relay-dce=no

  1    name="farsync2" mtu=1500 line-protocol=sync-ppp media-type=V35
       clock-rate=64000 clock-source=external chdlc-keepalive=10s
       frame-relay-lmi-type=ansi frame-relay-dce=no
[admin@MikroTik] interface farsync>
```

You can monitor the status of the synchronous interface:

```
[admin@MikroTik] interface farsync> monitor 0
           card-type: T2P FarSync T-Series
               state: running
         firmware-id: 2
    firmware-version: 0.7.0
      physical-media: V35
               cable: detected
               clock: not-detected
       input-signals: CTS
      output-signals: RTS DTR
[admin@MikroTik] interface farsync>
```

# Troubleshooting

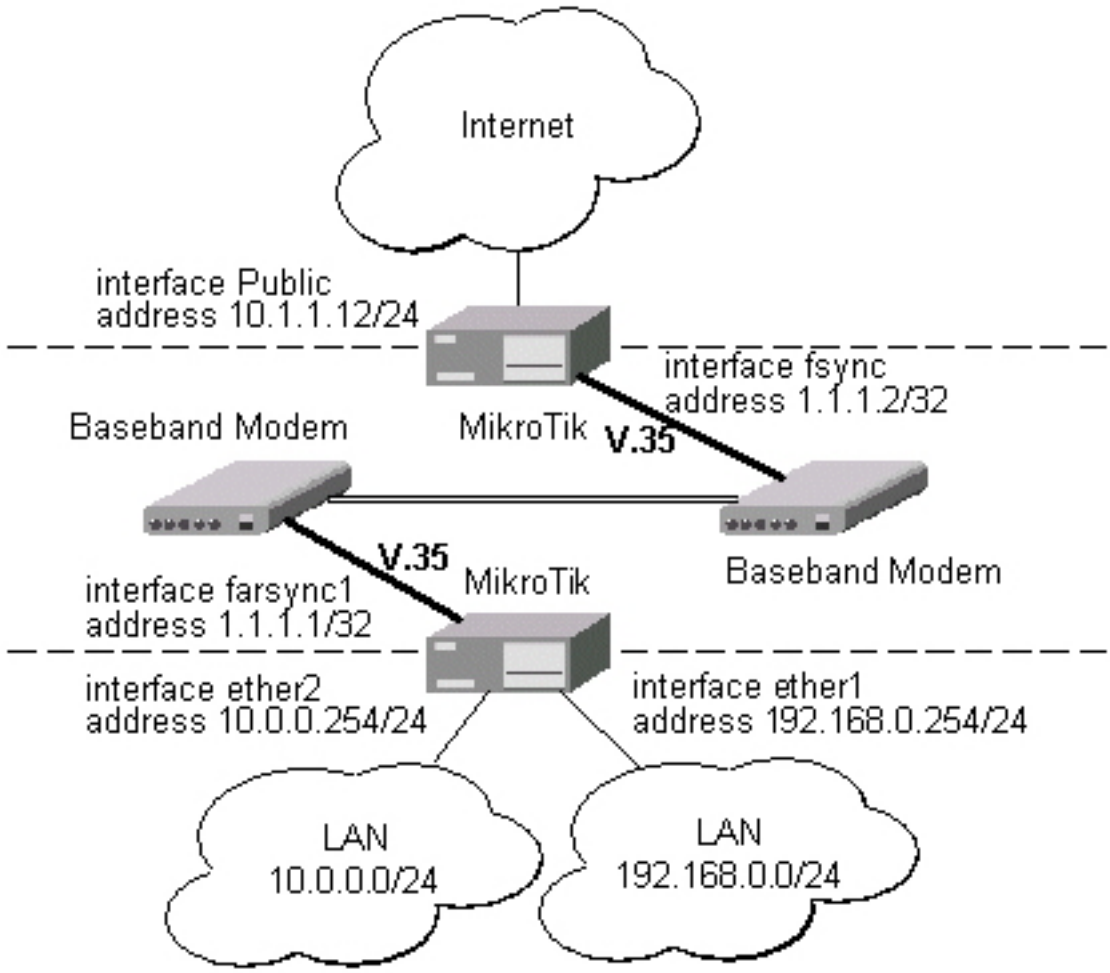
## Description

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

# Synchronous Link Applications

## 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 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=farsync1 \
\... 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 farsync1
[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>
```

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

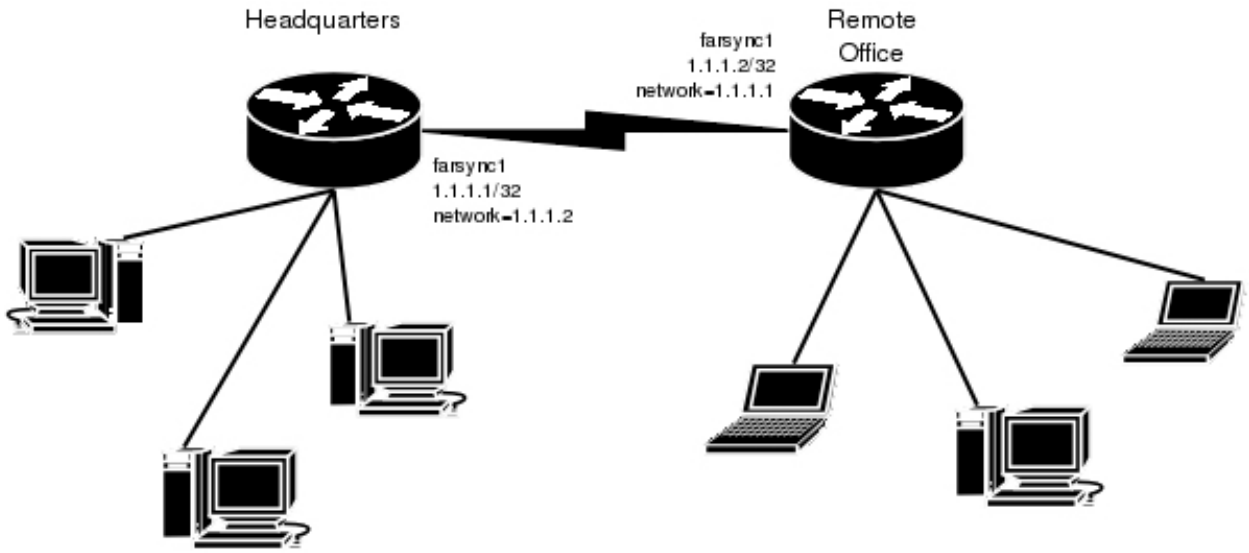
```
[admin@MikroTik] ip route> add gateway 1.1.1.2
[admin@MikroTik] ip route> print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
 #      DST-ADDRESS        PREF-SRC        G GATEWAY         DISTANCE INTER...
 0 A S  0.0.0.0/0                         r 1.1.1.2         1        farsync1
 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        farsync1
[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=fsync \
\... 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 fsync
[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 MikroTik router P2P using X.21 line

Consider the following example:



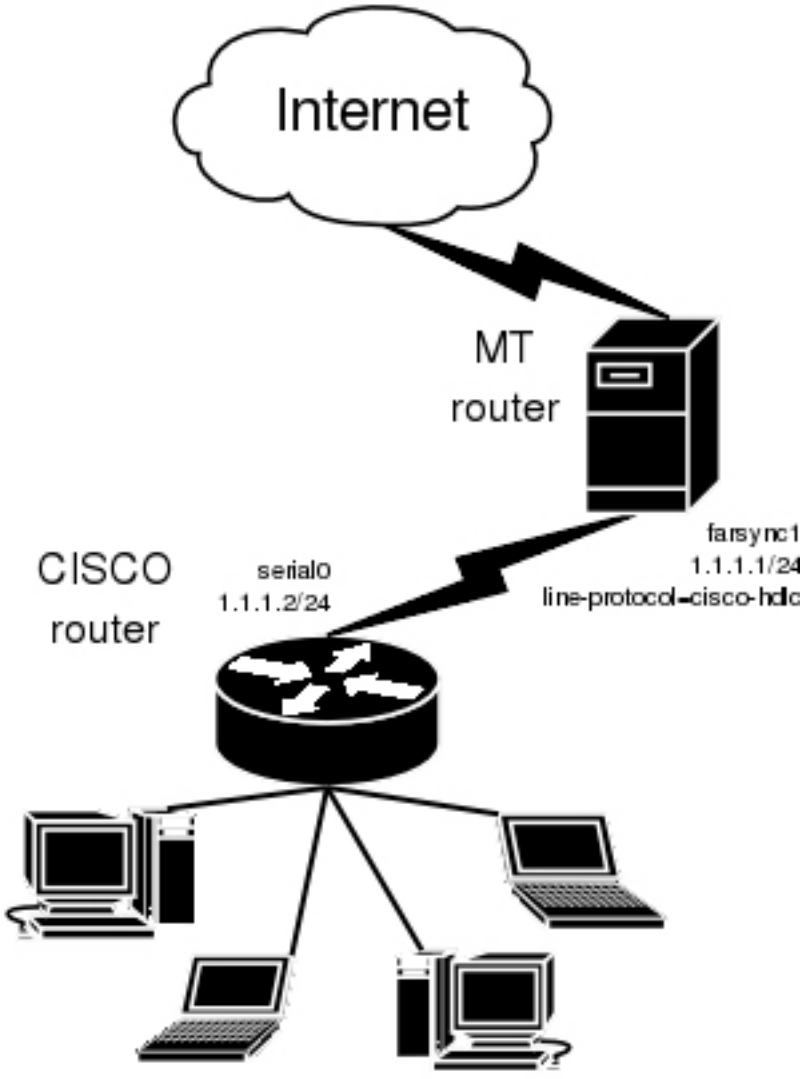

The default value of the property **clock-source** must be changed to **internal** for one of the cards. Both cards must have **media-type** property set to **X21**.

**IP address** configuration on both routers is as follows (by convention, the routers are named **hq** and **office** respectively):

```
[admin@hq] ip address> pri
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   192.168.0.1/24     192.168.0.0     192.168.0.255   ether1
  1   1.1.1.1/32         1.1.1.2         1.1.1.2         farsync1
[admin@hq] ip address>

[admin@office] ip address>
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   10.0.0.112/24      10.0.0.0        10.0.0.255      ether1
  1   1.1.1.2/32         1.1.1.1         1.1.1.1         farsync1
[admin@office] ip address>
```

## MikroTik router to Cisco router using X.21 line

Assume we have the following configuration:




The configuration of MT router is as follows:

```
[admin@MikroTik] interface farsync> set farsync1 line-protocol=cisco-hdlc \
\... media-type=X21 clock-source=internal
[admin@MikroTik] interface farsync> enable farsync1
[admin@MikroTik] interface farsync> print
```

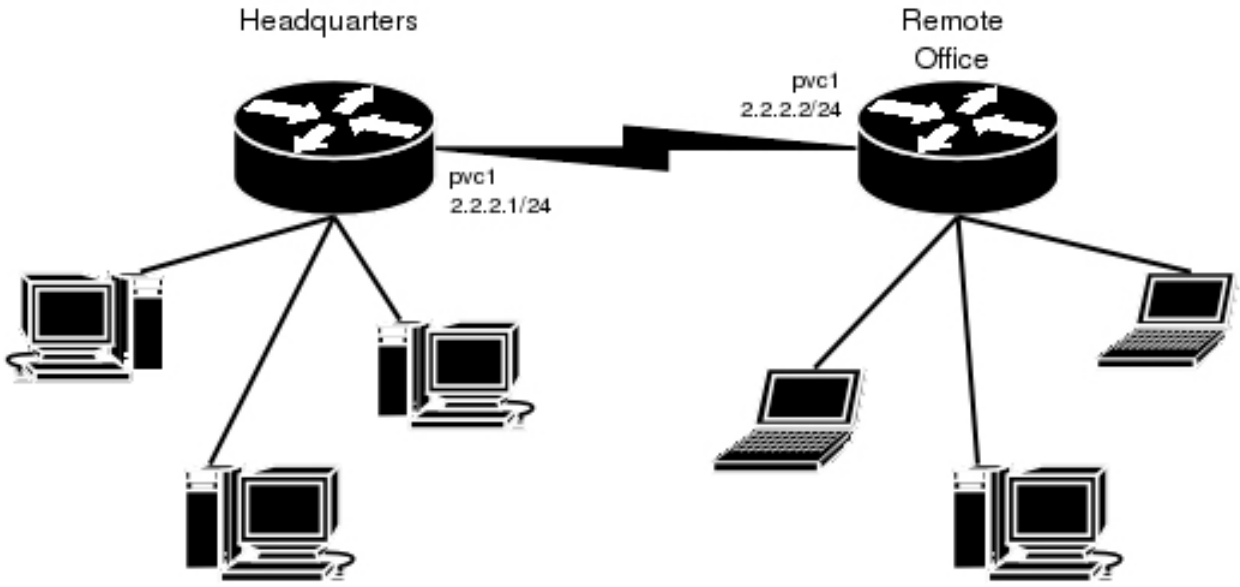
```
Flags: X - disabled, R - running
  0  R name="farsync1" mtu=1500 line-protocol=cisco-hdlc media-type=X21
       clock-rate=64000 clock-source=internal chdlc-keepalive=10s
       frame-relay-lmi-type=ansi frame-relay-dce=no

  1 X  name="farsync2" mtu=1500 line-protocol=sync-ppp media-type=V35
       clock-rate=64000 clock-source=external chdlc-keepalive=10s
       frame-relay-lmi-type=ansi frame-relay-dce=no
[admin@MikroTik] interface farsync>
[admin@MikroTik] interface farsync> /ip address add=address=1.1.1.1/24 \
\... interface=farsync1
```

The essential part of the configuration of Cisco router is provided below:

```
interface Serial0
 ip address 1.1.1.2 255.255.255.0
 no ip route-cache
 no ip mroute-cache
 no fair-queue
!
ip classless
ip route 0.0.0.0 0.0.0.0 1.1.1.1
```

## MikroTik router to MikroTik router using Frame Relay

Consider the following example:




The default value of the property **clock-source** must be changed to **internal** for one of the cards. This card also requires the property **frame-relay-dce** set to **yes**. Both cards must have **media-type** property set to **X21** and the **line-protocol** set to **frame-relay**.

Now we need to add **pvc** interfaces:

```
[admin@hq] interface pvc> add dlci=42 interface=farsync1
[admin@hq] interface pvc> print
Flags: X - disabled, R - running
  #    NAME                                                MTU  DLCI INTERFACE
  0 X  pvc1                                                1500 42   farsync1
[admin@hq] interface pvc>
```

Similar routine has to be done also on **office** router:

```
[admin@office] interface pvc> add dlci=42 interface=farsync1
[admin@office] interface pvc> print
Flags: X - disabled, R - running
  #    NAME                                                MTU  DLCI INTERFACE
  0 X  pvc1                                                1500 42   farsync1
[admin@office] interface pvc>
```

Finally we need to add **IP addresses** to **pvc** interfaces and enable them.

On the **hq** router:

```
[admin@hq] interface pvc> /ip addr add address 2.2.2.1/24 interface pvc1
[admin@hq] interface pvc> /ip address print
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   10.0.0.112/24      10.0.0.0        10.0.0.255      ether1
  1   192.168.0.1/24     192.168.0.0     192.168.0.255   ether2
  2   2.2.2.1/24         2.2.2.0         2.2.2.255       pvc1
[admin@hq] interface pvc> enable 0
[admin@hq] interface pvc>
```

and on the **office** router:

```
[admin@office] interface pvc> /ip addr add address 2.2.2.2/24 interface pvc1
[admin@office] interface pvc> /ip address print
Flags: X - disabled, I - invalid, D - dynamic
  #   ADDRESS            NETWORK         BROADCAST       INTERFACE
  0   10.0.0.112/24      10.0.0.0        10.0.0.255      ether1
  1   2.2.2.2/24         2.2.2.0         2.2.2.255       pvc1
[admin@office] interface pvc> enable 0
[admin@office] interface pvc>
```

Now we can monitor the synchronous link status:

```
[admin@hq] interface pvc> /ping 2.2.2.2
2.2.2.2 64 byte ping: ttl=64 time=20 ms
2.2.2.2 64 byte ping: ttl=64 time=20 ms
2.2.2.2 64 byte ping: ttl=64 time=21 ms
2.2.2.2 64 byte ping: ttl=64 time=21 ms
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 20/20.5/21 ms
[admin@hq] interface pvc> /interface farsync monitor 0
           card-type: T2P FarSync T-Series
               state: running-normally
         firmware-id: 2
    firmware-version: 1.0.1
            physical: X.21
               cable: detected
               clock: detected
       input-signals: CTS
      output-signals: RTS,DTR
[admin@hq] interface pvc>
```