

SATEL

Mission-Critical Connectivity

SATELLAR

Configuration quick steps for IP radio network

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Please do find the example pictures for the radio network at the end of this guide.

Default IP address: 192.168.1.1/24

SATELLAR WEB UI access:

– Username: *satellar*

– Password: *Satel123*

Administrator entry:

– Username: *admin*

– Password: *Satel456*

LCD UI default pin code: 0000

Apply Changes

Button is used for saving the modified parameter temporarily.

These changes will be listed/shown in the list of Uncommitted changes in the web GUI.

Commit Changes

Button is used for making all temporary changes permanent.

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Adjust the RMAC address according to your network design plan

NOTE1! Each radio in the same radio network shall have unique RMAC address.

***NOTE2!** Shall be set similarly to all of the radio modems in the same radio network.

- *NetID
- Address (RMAC)
- *Protocol Mode
(Packet Routing for IP datatransmission)

Modem Settings →

Network Protocol Mode

The screenshot displays the SATELLAR web interface. At the top, there is a navigation bar with tabs: Modem Settings (selected), Modem Info, Routing, Diagnostics, Firmware Updater, NMS Import, Tools, and Encryption. Below the navigation bar, the main content area is titled "SATELLAR" and shows the "Network Protocol Mode" configuration page. The page includes a "Status:" section with "Voltage: 12.8 V RSSI: 0 dBm" and "Time: 1980-02-04 14:13:08". The configuration fields are: "Network size support" (Small network support), "NetID" (SatelNet), "Address (RMAC)" (2), and "Protocol Mode" (Packet Routing). There is an "Apply Changes" button and a "No uncommitted changes" message. On the left side, a dark sidebar menu lists various settings: Network Protocol Mode (selected), Radio, Serial Connector Configuration, Data Port Settings, Serial Data Flow Control, Packet Mode Radio Access Control, General, Services, Commands, Remote Devices, SNMP, Time Control, and Testing And Calibration. At the bottom of the sidebar, there is a "Reload NMS values (NOTE)" section with a "Reload" button.

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Adjust the radio parameters according to your network design plan.

*NOTE! Shall be set similarly to all of the radio modems in the same radio network.

- TX/RX frequencies
- *Channel Spacing
- *Air Speed

Modem Settings →
Radio

| Radio modulation | Air Speed bps @ 12,5kHz | Sensitivity (BER 10E-3) |
|------------------|----------------------------|-------------------------|
| 4- FSK | 9600 | -119dBm |
| 8- FSK | 14400 | -112dBm |
| 16- FSK | 19200 | -104dBm |
| Radio modulation | Air Speed bps @ 25kHz | Sensitivity (BER 10E-3) |
| 4- FSK | 19200 | -116dBm |
| 8- FSK | 28800 | -108dBm |
| 16- FSK | 38400 | -102dBm |
| Radio modulation | Air Speed bps @ 150kHz | Sensitivity (BER 10E-3) |
| 4- FSK | 115200 | -104dBm |
| 8- FSK | 172800 | -96dBm |
| 16- FSK | 230400 | -88dBm |

The screenshot shows the SATELLAR configuration interface. At the top, there are tabs for Modem Settings, Modem Info, Routing, Diagnostics, Firmware Updater, NMS Import, Tools, and E. The Modem Settings tab is active, and a dark sidebar menu is open, listing various settings categories: Network Protocol Mode, Radio, Serial Connector Configuration, Data Port Settings, Serial Data Flow Control, Packet Mode Radio Access Control, General, Services, Commands, Remote Devices, SNMP, Time Control, and Testing And Calibration. The 'Radio' option is highlighted. Below the sidebar, the main configuration area is titled 'SATELLAR' and shows the status: Voltage: 24.0 V, RSSI: -126 dBm, and Time: 1980-02-01 01:14:20. The configuration parameters are as follows:

| | | |
|--------------------------|--|-----|
| TX Frequency | <input type="text" value="420.07500"/> | MHz |
| RX Frequency | <input type="text" value="420.07500"/> | MHz |
| RF Output Power | <input type="text" value="100 mW"/> | |
| Signal Threshold | <input type="text" value="-118"/> | dBm |
| Over-the-Air Encryption | <input type="text" value="OFF"/> | |
| Forward Error Correction | <input type="text" value="OFF"/> | |
| Channel Spacing | <input type="text" value="25.00 kHz"/> | |
| Air Speed | <input type="text" value="38400 bps"/> | |

At the bottom of the configuration area, there is an 'Apply Changes' button and a status message: 'No uncommitted changes'.

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Select the Network Topology according to your network design plan.

***NOTE!** Shall be set similarly to all of the radio modems in the same radio network.

- *Network Topology
- *Retransmissions

(recommended to set to ON state if using TCP protocol)

Modem Settings →

Packet Mode Radio Access Control

The screenshot displays the SATELLAR configuration interface. At the top, there are navigation tabs: Modem Settings, Modem Info, Routing, Diagnostics, Firmware Updater, NMS Import, and Tools. The Modem Settings tab is active, and a dark overlay menu is open, listing various configuration options. The 'Packet Mode Radio Access Control' option is highlighted. Below this menu, the main configuration page for 'SATELLAR' is visible. It shows the status: Voltage: 12.8 V RSSI: 0 dBm and Time: 1980-02-04 14:14:07. The configuration settings are: Network Topology (Point-to-point), Retransmissions (OFF), and Back Off Counter (8). There is an 'Apply Changes' button and a message 'No uncommitted changes'.

Modem Settings | Modem Info | Routing | Diagnostics | Firmware Updater | NMS Import | Tools

- Network Protocol Mode
- Radio
- Serial Connector Configuration
- Data Port Settings
- Serial Data Flow Control
- **Packet Mode Radio Access Control**
- General
- Services
- Commands
- Remote Devices
- SNMP
- Time Control
- Testing And Calibration

Reload NMS values (NOTE)

Reload

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Status:
Voltage: 12.8 V RSSI: 0 dBm
Time: 1980-02-04 14:14:07

Network Topology

Retransmissions

Back Off Counter

No uncommitted changes

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Configuration quick steps for IP radio network

Set the Packet Routing Tables according to your network design plan.

Neighbor: the RMAC address of a direct neighbor

Remotes: RMAC that can be reached behind this RMAC

NOTE! Each radio in the radio network has an unique RMAC address, thus the Packet Routing Tables vary.

Routing →

Packet routing Tables

Modem Settings Modem Info **Routing** Diagnostics Firmware Updater NMS Import Tools Encryption Logs Administ

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Status:
Voltage: 12.8 V RSSI: 0 dBm
Time: 1980-02-04 14:14:54

Add New Packet Routes:

Neighbor: Remotes: (separate with whitespace)

Add Routing Data

Add Multiple Routes to Neighbors:

First Address: Last Address:

Create a set of routes to neighbors

Add Multiple Routes to Remotes:

Neighbor: First Address: Last Address:

Create a set of routes to remotes

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Configuration quick steps for IP radio network

Set the IP routes according to your network design plan.

- If all the traffic is controlled only by the “Master” modem, only this modem really requires all the IP routes to whole network. In this case all the “substations” shall have the minimum information of how to get to the subnet behind the “Master” radio and the radio gateway (as in e.g. 10.10.32.1).
- Setting all the radio networks IP routes to all of the radio modems in the radio network, allows the connection to be established from any radio to every radio (i.e. from any subnet to every subnet).

Routing → IP Routes

The screenshot displays the SATELLAR web interface. At the top, there is a navigation menu with tabs: Modem Settings, Modem Info, Routing, Diagnostics, Firmware Updater, NMS Import, Tools, Encryption, Logs, Administration, and Logout. The 'Routing' tab is active. On the left side, a dark sidebar contains a list of routing options: Packet Routing Tables, IP, VLAN, IP Routes (highlighted), Route Monitoring, VRRP, Serial IP RS-232, Serial IP USB-A, and Application Routing. Below this list is a 'Reload NMS values (NOTE)' section with a 'Reload' button. The main content area shows the 'SATELLAR' status, including 'Status: Voltage: 12.8 V RSSI: 0 dBm' and 'Time: 1980-02-04 14:15:37'. Below the status, there is an 'Add New Route' section with a form containing '0.0.0.0/0 0.0.0.0' and 'Metric: 0', and an 'Add New Route' button. Further down, there is a section for creating a set of IP routes with fields for 'First Address', 'Last Address', 'Base Address', 'Mask', and 'Metric' (set to 0), and a 'Create a set of IP routes' button. At the bottom, there is an 'Edit Routes' section with buttons for 'Apply Changes', 'Delete Selected', and 'Delete to defaults'. A footer message states 'No uncommitted changes'.

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Before changing the IP address of the connected radio, it is advisable to commit the changes made to the SATELLAR. After the IP address is changed, the connection between the SATELLAR and PC is lost due to the IP change.

Uncommitted changes

```
Address (RMAC): 1
TX Frequency: 420.07500
RX Frequency: 420.07500
RF Output Power: 100
Air Speed: 4
Added packet routing table device 2
Added IP route number 1: 192.168.1.3/32 10.10.32.2 0 0
```

Commit Changes

Cancel applied changes

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Set the IP Address 0 for your SATELLAR radio modem. After Applying and Committing the changes, IP address is renewed, WEB UI attempts to connect to the new IP address.

Routing → IP

The screenshot displays the SATELLAR web interface. At the top, there is a navigation bar with tabs: Modem Settings, Modem Info, Routing, Diagnostics, Firmware Updater, NMS Import, Tools, and Encryption. The 'Routing' tab is selected, and a dark sidebar menu is open, listing options: Packet Routing Tables, IP, VLAN, IP Routes, Route Monitoring, VRRP, Serial IP RS-232, Serial IP USB-A, and Application Routing. The 'IP' option is highlighted. Below the sidebar, there is a 'Reload NMS values (NOTE)' section with a 'Reload' button. The main content area shows the 'SATELLAR' status page. It includes a 'Status' section with 'Voltage: 12.8 V RSSI: 0 dBm' and a 'Time: 1980-02-04 14:15:19'. Below this is a configuration table for IP settings:

| | | |
|--------------------------|---|------|
| IP Address 0 | <input type="text" value="192.168.1.1/24"/> | eth0 |
| IP Address 1 | <input type="text" value="10.10.32.2/19"/> | tun0 |
| QoS Set | <input type="text" value="All open"/> | |
| DHCP State | <input type="text" value="OFF"/> | |
| Ethernet Speed | <input type="text" value="Auto"/> | |
| Automatic IP State | <input type="text" value="OFF"/> | |
| Current IP Address | <input type="text" value="192.168.1.1"/> | |
| Current Network Mask | <input type="text" value="24"/> | |
| Ethernet Duplex | <input type="text" value="Full"/> | |
| IP Queue Max Time Length | <input type="text" value="5000"/> | ms |
| IP Queue Max Packets | <input type="text" value="10"/> | |

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Configuration examples

Example no.:1

IP route 192.168.2.0/24 10.10.32.2 "you can get to 192.168.2.0 subnet, consisting of host address range 192.168.2.1 – 192.168.2.254, by using the route 10.10.32.2(=RMAC address 2)".

Example no.:2(see pictures 1 and 2)

R1 = IP address 192.168.1.1/24
Tun0=10.10.32.1/19 (=RMAC 1)

R3 = IP address 192.168.3.1/24
Tun0=10.10.32.3/19 (=RMAC 3)

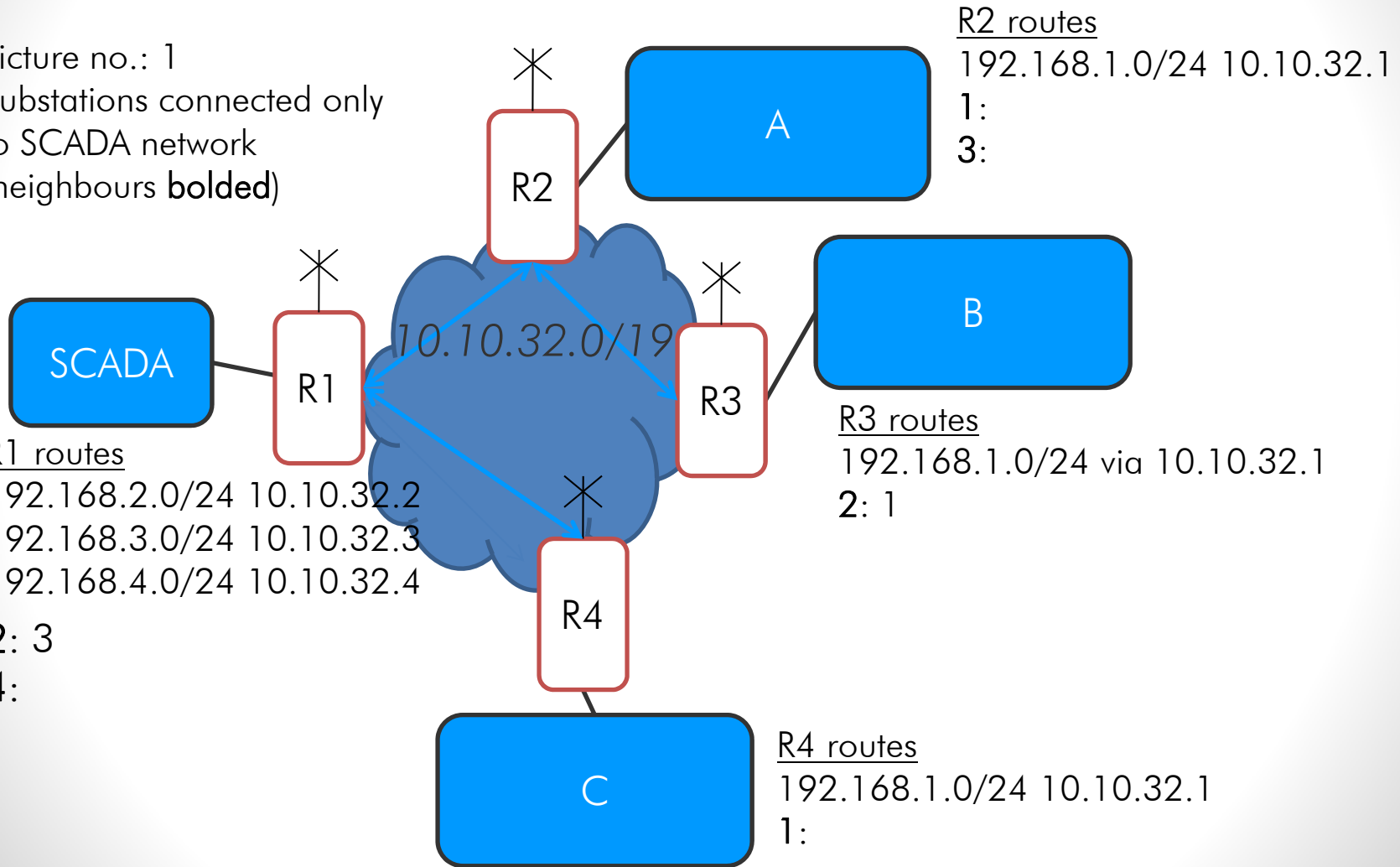
R2 = IP address 192.168.2.1/24
Tun0=10.10.32.2/19 (=RMAC 2)

R4 = IP address 192.168.4.1/24
Tun0=10.10.32.4/19 (=RMAC 4)

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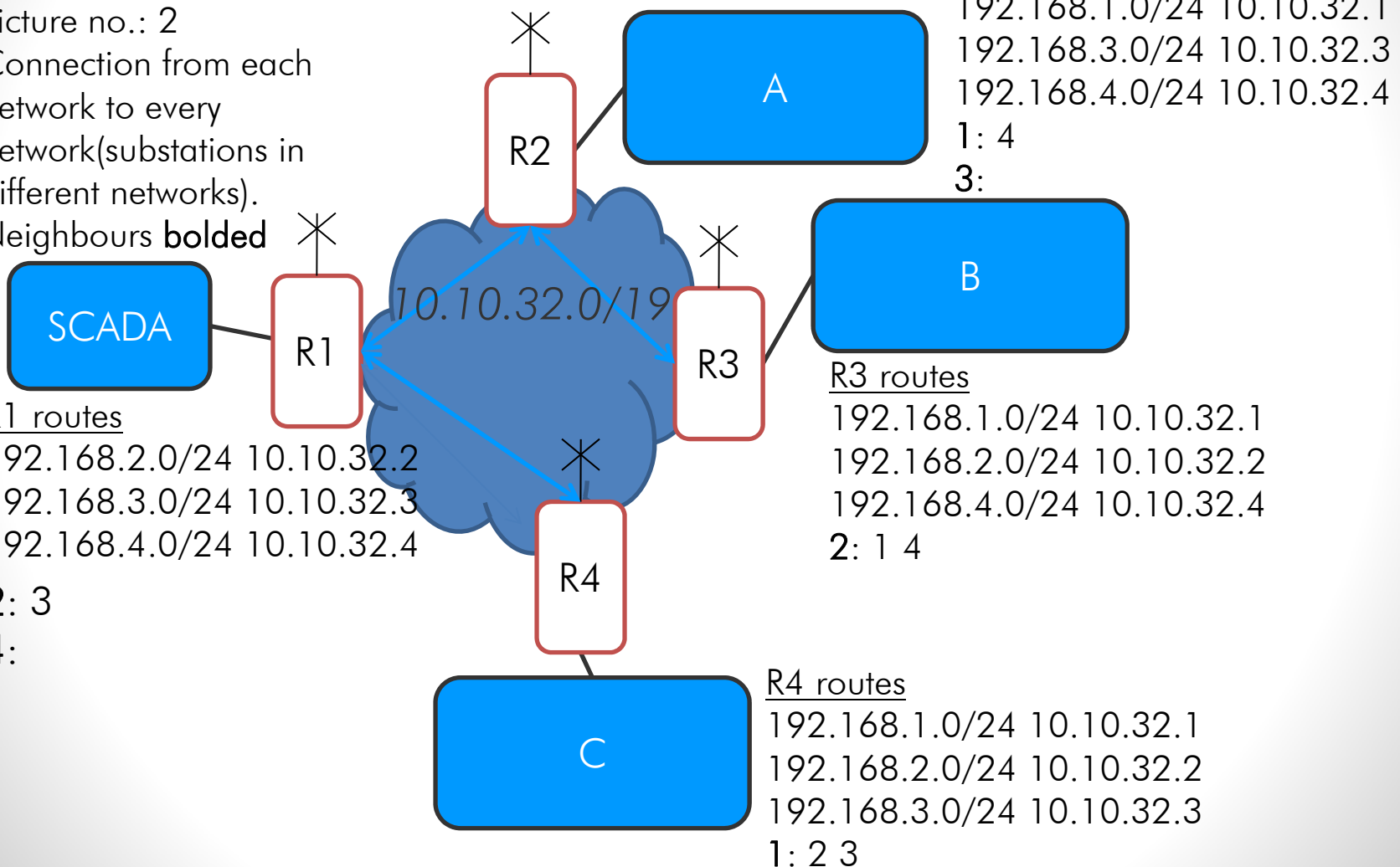
Picture no.: 1
Substations connected only
to SCADA network
(neighbours **bolded**)



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Configuration examples

Picture no.: 2
 Connection from each network to every network (substations in different networks).
 Neighbours **bolded**



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Configuration examples

All stations in same subnet, substations connected only to SCADA (neighbours **bolded**).
NOTE! Proxy ARP shall be enabled! Routing → IP

