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Configuration and Diagnostic Program
for SUMMIT DEVELOPMENT Radio Relay Links

SUMMIT MANAGEMENT SYSTEM

User Manual

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1 INTRODUCTION

The Summit Management System (SMS) program is used to configure, diagnose and supervise SUMMIT DEVELOPMENT radio relay links.

SMS does not require installation. This is a standalone executable file named `smisc.exe`. The program's latest version is freely available at www.summitd.cz (the program is compressed in a ZIP file and needs to be extracted before you run it).

SMS can be run under WINDOWS and in the LINUX environment using the WINE program.

1.1 Unblock and extension PINs

When you first run your SUMMIT DEVELOPMENT device, the counter is activated indicating the number of days after which the device will be blocked (30 days by default). By that time, the unblock PIN must be entered on the **Radio** page. The customer receives the PIN from the immediate seller of the link once it has been paid in full.

If the link is purchased in instalments, an extension PIN is generated to the customer after each instalment, thus extending the number of days after which the device will be blocked (until it has been paid in full).

There are two types of PINs that are entered in SMS differently - see figure 1!

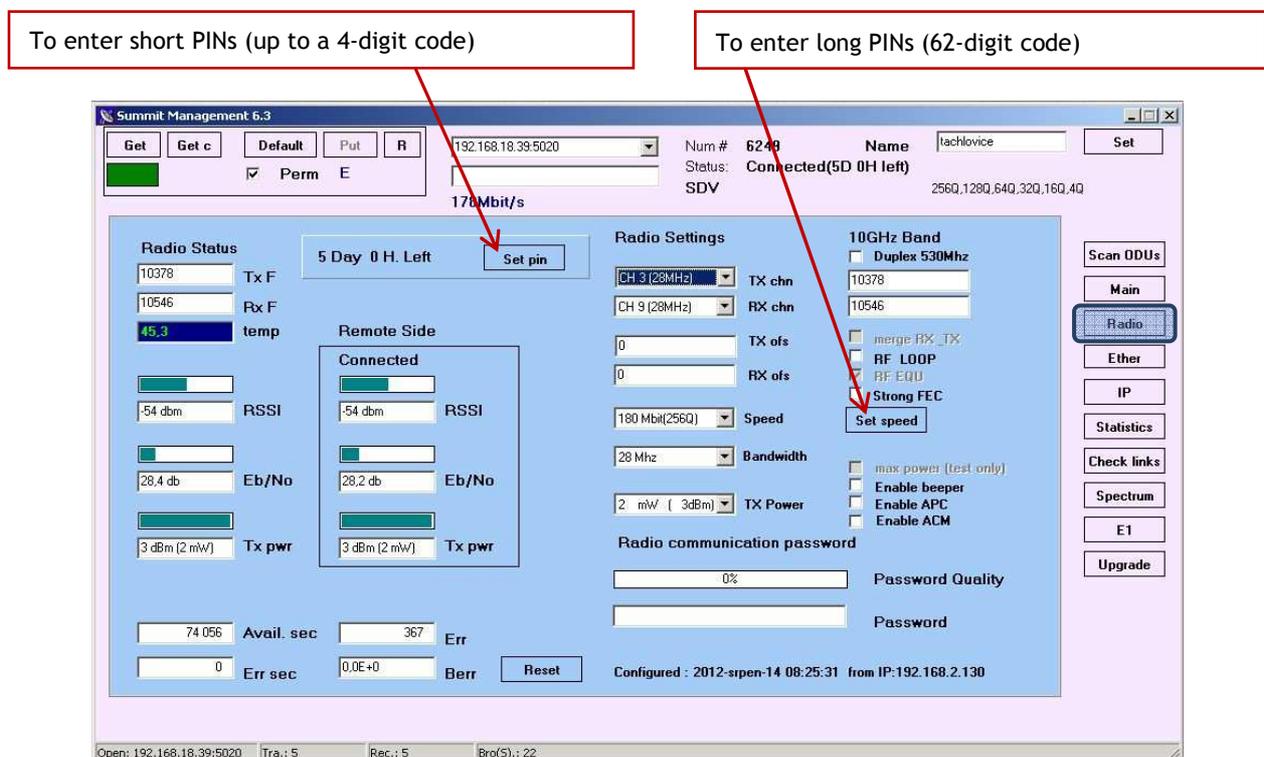


Figure 1

2 PROGRAM ENVIRONMENT

2.1 Main control panel

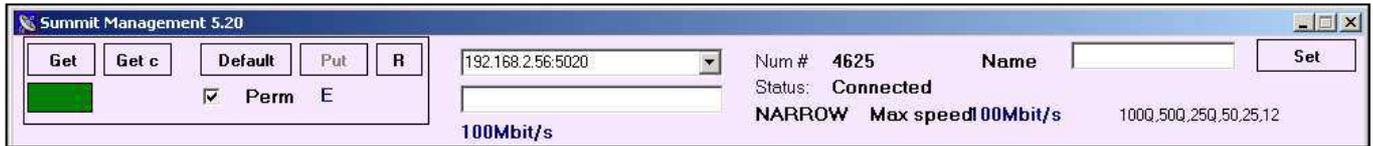


Figure 2: The main control panel

Get	Updates values from the device.
Get c	Updates values from the device continuously after one second. To stop the communication, click the Get button or click the coloured communication progress indicator (located under the Get button).
Default	Restores radio settings to factory values (IP address does not change).
Put	Saves any changed settings to the device (Note: Executing Put can be protected by a security password).
Perm	Sets the way in which changes are saved to the device. If the Perm button is checked, changes will be made permanently. If the Perm button is unchecked, changes will be made temporarily (non-permanently) for 5 minutes and the original settings will then be restored automatically.
R	Switches between the link's local E (Ethernet) and Remote R sides. The side is indicated by a blue letter under the Put button. If radios are not connected, the R button is inactive (greyed out).

The connection progress indicator

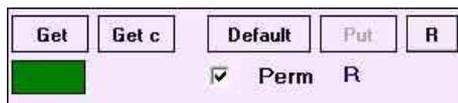


Figure 3

← The last connection with the device was successful, Figure 3.

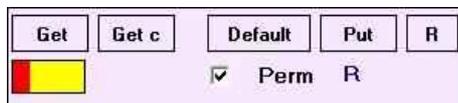


Figure 4

← The connection with the device is in progress, Figure 4. (To stop the connection in progress, click the connection progress indicator.)

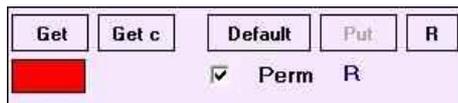


Figure 5

← The last connection with the device failed, Figure 5.

Num #	The serial number of the device.
Name	This field is used to enter/display the device name.
Set	This button saves the device name.

NARROW	Device model (for example ALTER, QAM, SDV, UNI, UNIC).
Max speed	The maximum bitrate allowed in the device.
100Q, 50Q, 25Q ...	Permitted modulations in the device.
Status	<p>The connection status. The status may be followed by information on the expiry of the device. The counter uses the (xxD xxH left) format to inform in how many days and hours the device will be blocked. The PIN to deactivate the counter will be provided to the owner once the device has been paid.</p> <p>Connected Connected in Full Duplex mode</p> <p>Connected (VPN mishmash) Incorrect encryption setting (the link is physically connected but does not transmit data correctly)</p> <p>Connected (Rem. n.c.) The remote side is in Not connected status</p> <p>Not connected The local side is in Not connected status</p> <p>No stat available Information is not available.</p>
IP adress (+port)	Enter the IP address and port in this field, see Figure 6. The drop-down list box contains a history of the last 10 devices that were loaded in SMS, see Figure 8.
Security password	A security password to communicate with the device is entered in the field, see Figure 6 (the bottom field). Left double click to mask the security password with the "*" character, see Figure 7.

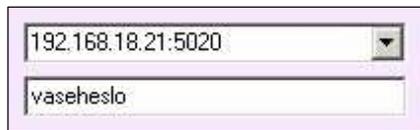


Figure 6

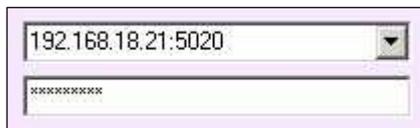


Figure 7



Figure 8

Actual Speed	Indicates the actual speed in the RX channel (the speed depends on the other party's transmitter). The value is shown in blue under the field that is used for entering the security password to communicate with the device.
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2.2 Main menu

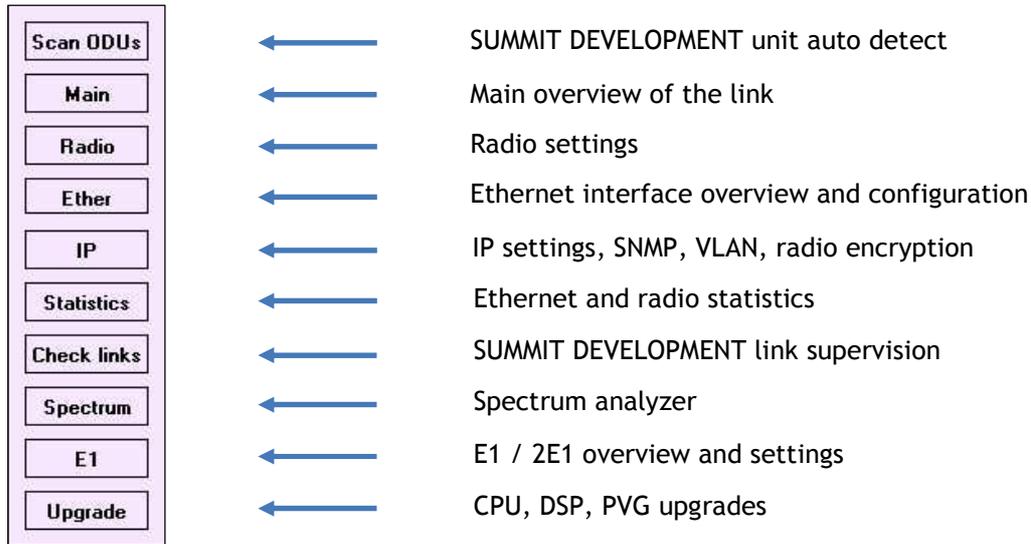


Figure 9

2.3 Status bar

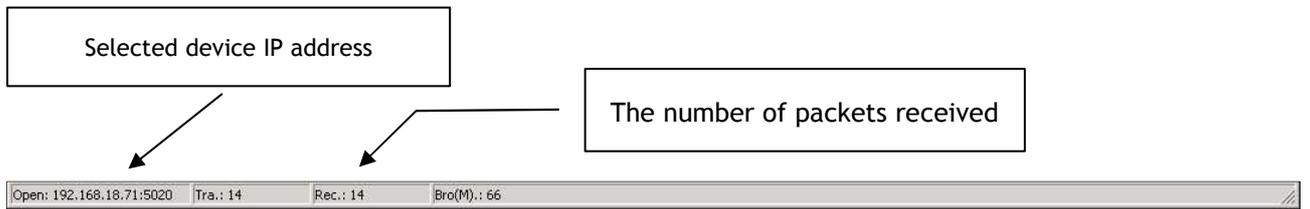


Figure 10

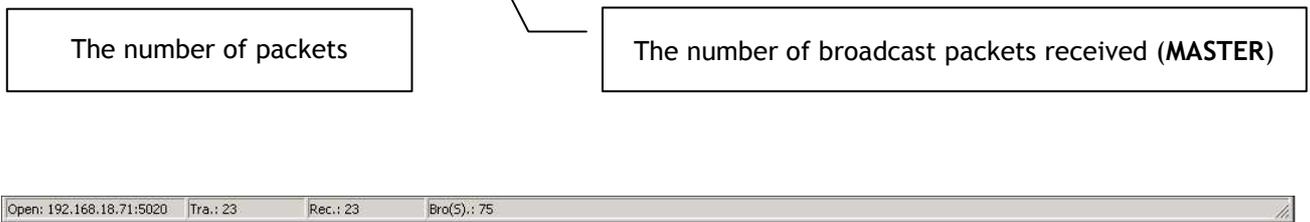


Figure 11

Link configuration and supervision cannot be run until the 6th instance of the SMS programme. The first SMS launch is always MASTER, see Figure 10. Each subsequent launch is SLAVE, see Figure 11. A MASTER instance replicates broadcasts into SLAVE instances. If the MASTER instance ends, broadcasts will no longer be replicated into SLAVE instances (until a new SMS instance is launched).

3 SCAN ODU_s

3.1 SUMMIT device auto detect

The initial IP address setting is made using a mechanism that is based on receiving broadcast packets that are transmitted from the device. This is done using the 53416 dynamic UDP port. Once the power supply and the data cable are connected to the network card, the device is identified in the table, see Figure 12. This mechanism only works in the local network up to the first router. If the device does not appear in the table, check the UDP packet throughput settings of your firewall.

The screenshot shows the Summit Management 6.2 interface. At the top, there are control buttons: Get, Get c, Default, Put, R, and a dropdown menu showing the IP address 192.168.18.64:5020. Below these are checkboxes for 'Perm' and 'R'. To the right, there are fields for 'Num # 5334', 'Name chynice', 'Status: Connected', and 'SDV Max speed 256 Qam'. A speed indicator shows '178Mbit/s'. A table with columns: Name, Num#, IP addr, Sub. mask, Def. gate, Port, IP resc., VLAN, Status, RSSI, and Old(h:m:s) contains the following data:

Name	Num#	IP addr	Sub. mask	Def. gate	Port	IP resc.	VLAN	Status	RSSI	Old(h:m:s)
chynice	5334	192.168.18.64	...	...	5020	off	...	Connected	-56	0:0:0
tachlovice	4497	192.168.18.71	...	...	5020	off	...	Connected	-55,5	0:0:0
	6278	192.168.2.38	...	...	5020	off	...	Connected Loop	-62	0:0:0
silodobric	4626	192.168.2.46	...	...	5020	192.168.2.0/24	3 (Pri:7)	Connected	-56	0:0:27
kostel-orech	4625	192.168.2.56	...	...	5020	192.168.2.0/24	3 (Pri:7)	Connected	-54	0:0:53

At the bottom of the interface, there are buttons for 'Set IP', 'Clear', and 'Scan'. A status bar at the very bottom shows: Open: 192.168.18.64:5020, Tra.: 117, Rec.: 117, Bro(M): 234.

Figure 12

The radio device transmits basic setting and status information every 30 seconds. This information is shown and regularly updated in the **Scan ODU_s** table, see Figure 12 (note: to turn off broadcast packets transmitting, go to the **IP - Broadcast sending off** page).

Name	The name of the device.
Num#	Serial number (odd = lower XL, even = upper XH).
IP addr	The IP address of the device.
Sub. mask	Subnet mask (do not fill in / this concerns L2 devices).
Def gate	Default gateway (do not fill in / this concerns L2 devices).
Port	UDP port number for communicating with the device.
IP resc.	Restricted access to device management by IP range.
VLAN	VLAN parameters, for more information see the IP set section.
Status	The status of the device.

RSSI	Received signal strength.
Old [h:m:s]	Time elapsed since receiving the last broadcast from the device.
Clear	SMS restart (the device is reloaded in the table).
Set IP	Sets the IP address + deletes the device management access password.
Scan	Searches for the SUMMIT device in the local network (for faster detection in the table).

3.2 Setting IP address

Click **Scan ODU**s and wait for the device to be auto-detected in the table (to speed up the process, use the **SCAN** button). Select the device in the table and click the **Set IP** button. The IP address setting window appears, see Figure 13. In the window, set the new IP address and confirm using the **Set new IP setting** button.

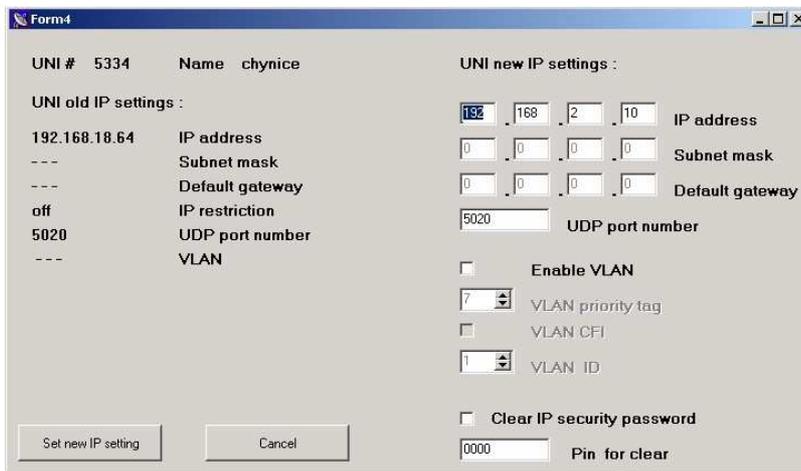


Figure 13

UNI old IP setting	The current IP setting.
UNI new IP setting	The new IP setting.
IP address	The IP address of the device.
Subnet mask	Subnet mask (do not fill in / this concerns L2 devices).
Default gateway	Default gateway (do not fill in / this concerns L2 devices).
UDP port number	UDP port number for communicating with the device.

3.3 Deleting read/write password

Click **Scan ODU**s and wait for the device to be auto-detected in the table (to speed up the process, use the **SCAN** button). Select the device in the table and click the **Set IP** button. The IP address setting window appears, see Figure 13. In the window, check **Clear IP security password** and enter the password clear PIN in the **Pin for clear** field. To confirm everything, use the **Set new IP setting** button.

Attention: If **Disable IP SET in Scan ODU**s is activated during the password clearing process (section 7.1), the device also needs to be restarted (by connecting and disconnecting the device from the power supply) for security reasons.

You will obtain the password clear PIN from the immediate seller, once verification is complete (contact the sales department).

4 MAIN

The page shows the link's basic settings and status, see Figure 14.

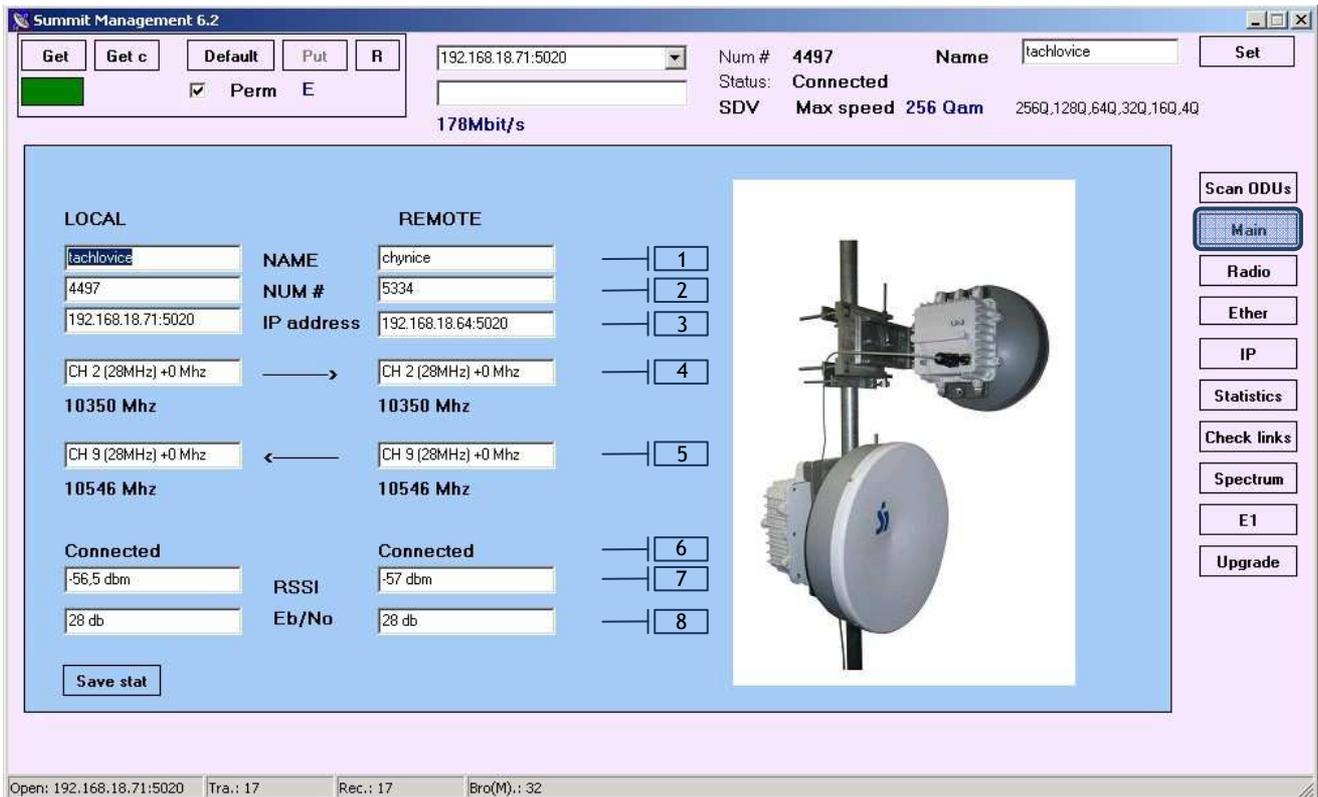


Figure 14

- | | |
|---|--|
| 1 | The name of the device. |
| 2 | Serial number (odd number = lower, even number = upper). |
| 3 | IP address. |
| 4 | Set channels + frequencies [MHz]. |
| 5 | Set channels + frequencies [MHz]. |
| 6 | Connection status. |
| 7 | RSSI - received signal strength. |
| 8 | Eb/No - the signal/noise ratio. |

5 RADIO

The page shows radio settings and status, see Figure 15.

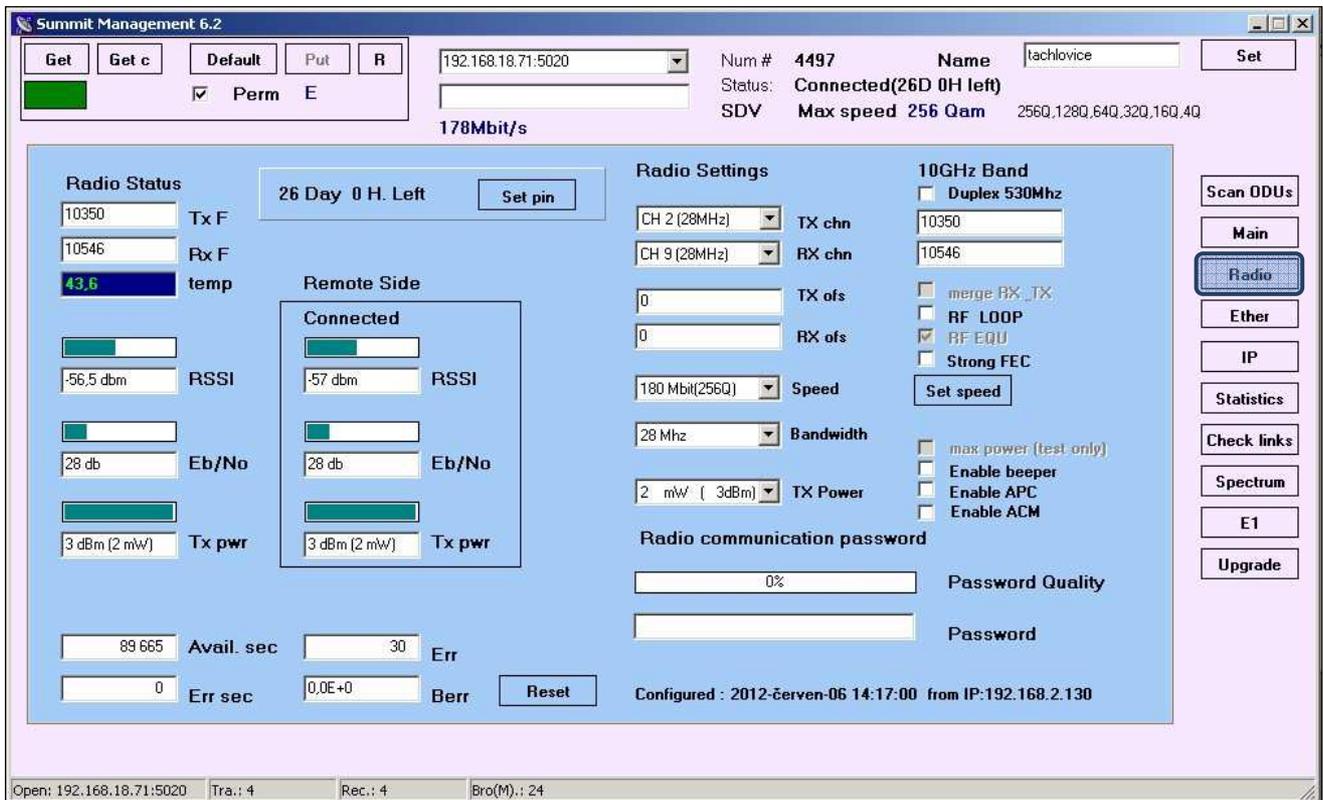


Figure 15

TX chn	Transmitter channel setting (the frequency (MHz) is displayed in the field on the right).
RX chn	Receiver channel setting (the frequency (MHz) is displayed in the field on the right).
TX ofs	Transmission frequency offset setting (in increments of min +/- 0.25 MHz and max ½ of the chosen Bandwidth).
RX ofs	Reception frequency offset setting (in increments of min +/- 0.25 MHz and max ½ of the chosen Bandwidth).
Speed	Sets radio speed by selecting from a drop-down list box.
Set speed	License-based increase in radio speed. Clicking the Set speed button opens the license code entry window, see Figure 16. To enable the radio speed in the Speed field, enter the license code and confirm using the Send button (for the new speed to apply, you must make a selection in the Speed drop-down list box and save it to the device).



Figure 16

Bandwidth	Changes the radio channel bandwidth. For the ALTER and NARROW series, the radio channel bandwidth can be decreased in decrements of 1 % (maximum change is 12 %). For the SDV series, the channel bandwidth can be changed according to the available schemes in the Bandwidth drop-down list box.
Tx Power	Transmission power setting.
Max Power	Maximum power setting for testing purposes (off).
RF LOOP	Loop on the radio. The frequency of the receiver is tuned to the frequency of its transmitter (note: after 2 minutes, the function deactivates and the receiver is tuned to the original frequency).
Enable beeper	Acoustic signalling for link routing. Higher frequency → greater received signal strength (note: the function deactivates after 15 minutes).
Enable APC	Enables automatic transmission power control.
Enable ACM	Enables adaptive modulation. This feature automatically reduces modulation in poor atmospheric conditions. If ACM is not enabled and the link collapses, the link is automatically tuned to 16 QAM modulation (until the conditions for the set modulation improve).
Configured	The date of the last configuration from the given IP address.

5.1 Radio beam encryption

The encryption is implemented based on GOLD CODES and has a width of 48 bits, see Figure 17. Encryption does not reduce link transmission capacity. If different passwords are set on both sides, the link status in the main control panel will show **Connected VPN mishmash**. This means that the link works correctly, but no data is transmitted.



Figure 17

Password Quality	Indicates the quality of the password (we recommend using a combination of both uppercase and lowercase letters and numbers).
Password	The password entry field.

5.2 Radio statistics

Tx F	Transmission frequency including freq. offset [MHz].
Rx F	Reception frequency including freq. offset [MHz].
temp	The temperature inside the device.
RSSI	Received signal strength [dBm].
Eb/No	The signal/noise ratio (including interference) [dB].
Tx power	Transmission power [dBm].

Avail. sec	Operating time (seconds) since the last reset.
Err sec	High-error seconds since the last reset (Err sec = an error rate of 10^{-6} and worse).
Err	The total number of errors on the radio since the last reset.
Berr	Error rate in the last second.
Reset	Resets the counters.

5.3 The number of days before the radio gets blocked

When the device is operated for the first time, the counter indicating the number of days before the device gets blocked is activated on the **RADIO** page, see Figure 15 and Figure 18. The value is displayed in the **XX Day YY H. Left** format. Once that time elapses, **Blocked** will display and the device will stop transmitting data, see Figure 19. The counter only counts down time when the device is turned on.



Figure 18



Figure 19

To deactivate the counter, click **Set pin** and enter your unblock PIN, see Figure 18 and Figure 19. You will obtain the unblock PIN from the immediate seller of the device automatically, once it has been paid.

6 ETHER

The page shows Ethernet settings and overview, see Figure 20.

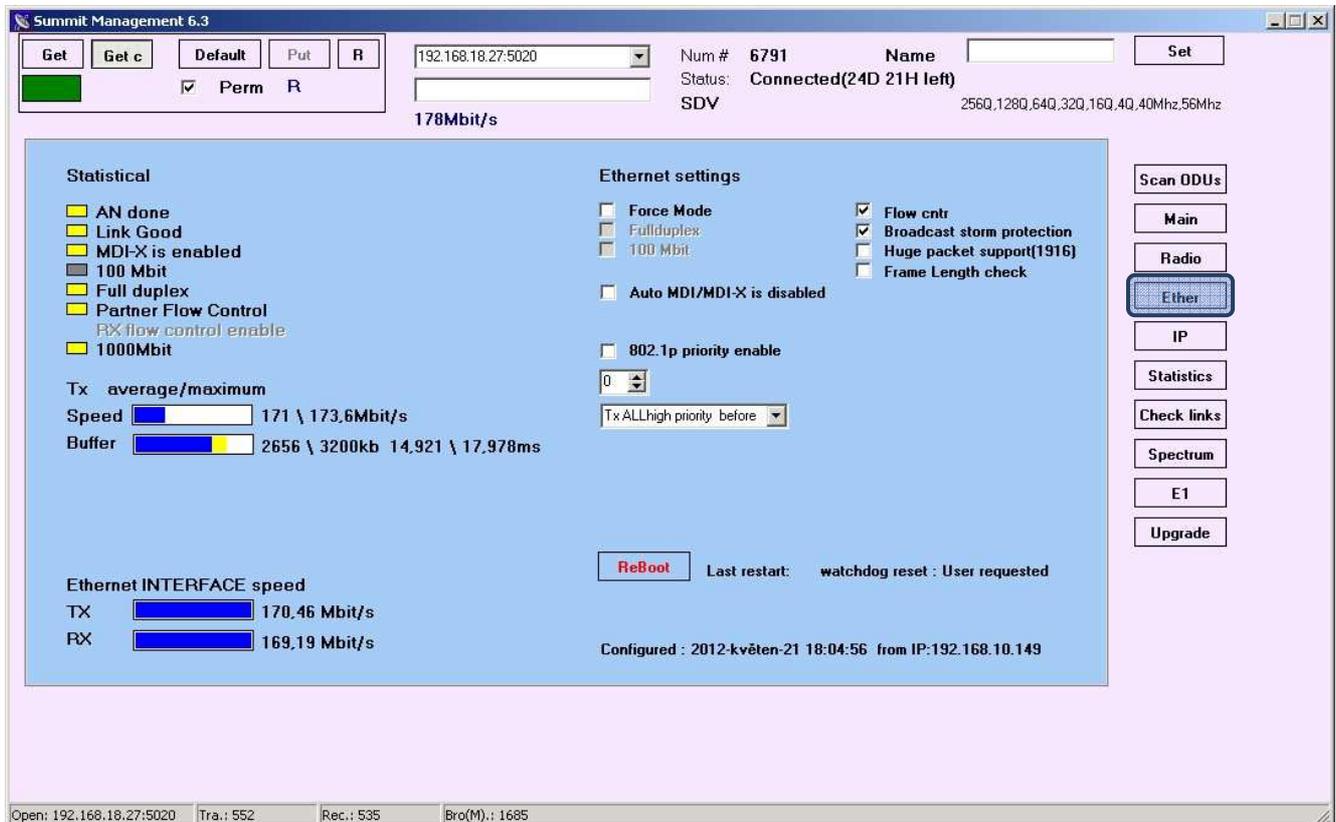


Figure 20

6.1 Setting the ETH interface

Force mode	If checked, the link's ETH interface is fixed-set to the 100 Mb/s, Full Duplex mode. If unchecked, auto-negotiation is selected.
Auto MDI/MDI-X	Automatic RX and TX pair swapping is not enabled on the device. Unless Auto MDI / MDI-X is enabled on the other network device, you need to use the correct type of cable to connect the device to the network element.
	Crossover cable: SUMMIT RADIO ↔ SWITCH / REPEATER / HUB
	Straight through cable: SUMMIT RADIO ↔ NIC CARD (laptop...)
Flow cntr	IEEE 802.3x compliant Flow Control. If input buffer gets overwhelmed, no frames are dropped. To function correctly, Flow Control must also be supported by the network element connected to the SUMMIT device.
Broadcast storm protection	Broadcast reduction to 3 %.

Huge packet support	Support for transmitting huge packets up to 1916 bytes.
Frame Length check	IEEE 802.3 compliant maximum packet length check. Other packets are dropped (including VLAN frames!).
802.1p priority enable	Enables IEEE 802.1p compliant packet prioritization. A 3-bit value in the eth frame determines in which queue the frame is placed. The priority level is set in the drop-down list box, see Figure 21.



Figure 21

TxALL high priority before	Higher-priority queue is transmitted first.						
Txhigh priority at 10:1 ratio	Sets the ratio between transmitted higher- and lower-priority packets at 10:1.						
Tx high priority at 5:1 ratio	Sets the ratio between transmitted higher- and lower-priority packets at 5:1.						
Tx high priority at 2:1 ratio	Sets the ratio between transmitted higher- and lower-priority packets at 2:1.						
ReBoot	Restarts the device (approximately 30 seconds). The IP setting remains unchanged after the restart.						
Last restart	Displays the reason for the last restart.						
	<table border="0"> <tr> <td>User requested</td> <td>Restart requested by user (the ReBoot button)</td> </tr> <tr> <td>Power on reset</td> <td>Restart by the main power supply</td> </tr> <tr> <td>Warm external reset</td> <td>Restart requested by device (may indicate a fault)</td> </tr> </table>	User requested	Restart requested by user (the ReBoot button)	Power on reset	Restart by the main power supply	Warm external reset	Restart requested by device (may indicate a fault)
User requested	Restart requested by user (the ReBoot button)						
Power on reset	Restart by the main power supply						
Warm external reset	Restart requested by device (may indicate a fault)						
Configured	Date of the last write operation to the device.						

6.2 ETH interface statistics

	Function active indicator (ON).
	Function inactive indicator (OFF).
AN done	Auto negotiation completed successfully.
Link Good	Network connection indicator.
MDI-X is enabled	Auto MDI / MDI-X enabled indicator.
100 Mbit	A bitrate of 100 Mbit/s (if deactivated, the 10 Mbit/s mode is used).
Full Duplex	Full Duplex mode (if deactivated, Half Duplex mode is used).

Partner Flow Control	Flow Control on the connected network device.
RX/TX Flow Control Enable	Flow Control on the SUMMIT device.
TX aver./max. (SPEED)	Average/maximum bitrate for data flow from the ETH port to the radio transmitter (metering sensor is located before the input buffer), see Figure 22.
Tx aver./max. (BUFFER)	Average/maximum value for data absorbed in the buffer, see Figure 22. The buffer size is 4098 kb for QAM, NARROW and ALTER models, and 8196 kb for SDV models.

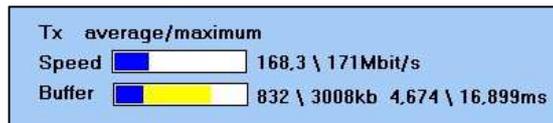


Figure 22

Eth interface speed RX	The speed of the data stream that is received from the ETH interface (the metering sensor is located after the Buffer).
Eth interface speed TX	The speed of the data stream that is transmitted to the ETH interface, see Figure 23.

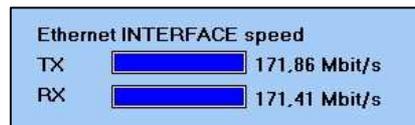


Figure 23

7 IP

The page is used for setting network protocols, the security password for reading/writing to the device etc, see Figure 24.

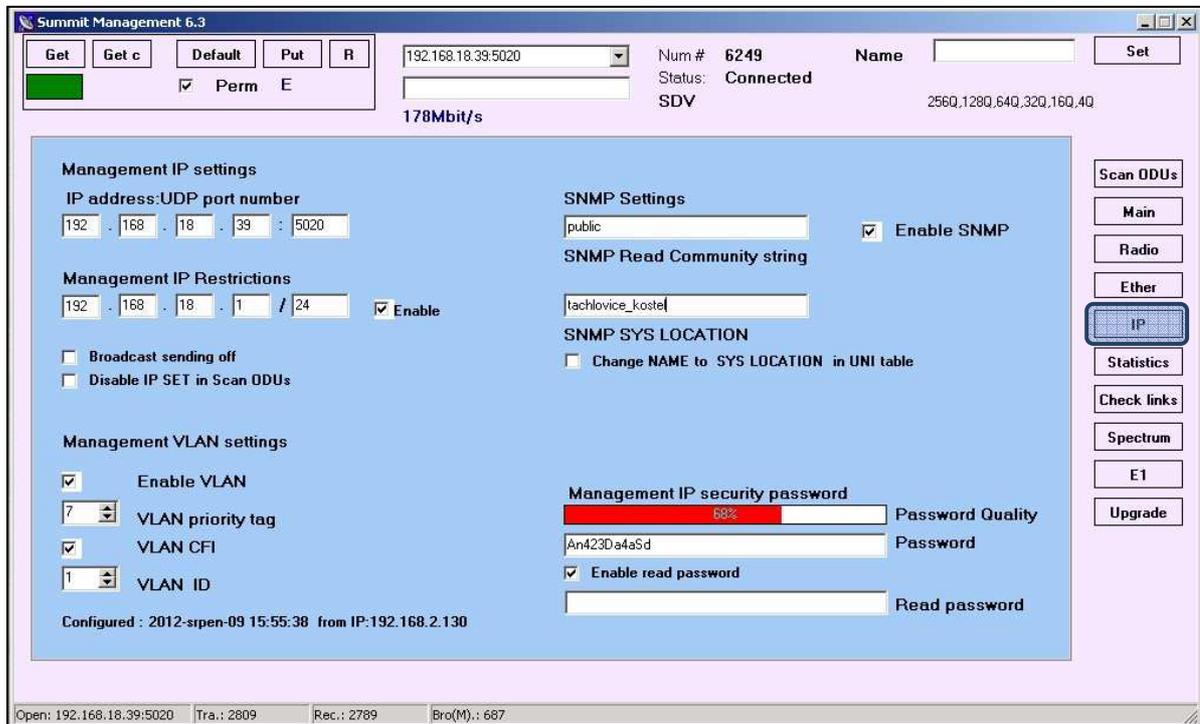


Figure 24

7.1 Changing the IP address and restricting access

After the IP address is initial set in **Scan ODU**s, the IP address of the device can also be subsequently changed in **IP** (for example, if you are not part of the broadcast domain and thus cannot change the IP address via the **Scan ODU**s page).

IP address: UDP port number Sets the 32-bit IP address and UDP port for communication with the device.

Management IP Restrictions Allows for restricting access to the device based on the network IP address.

Example:

192.168.18.0 / 24 IP address / 24-bit mask (255.255.255.0)

Only stations with an IP address of **192.168.18.xxx** can access the device.

Broadcast sending off Turns off broadcast sending from the device to the network. If the device is switched off and on again while this feature is enabled, 30 seconds of broadcasts are allowed to be sent 5 times in order to ensure the device is detected in **Scan ODU**s, and sending is then stopped.

Note: If the device is configured in VLAN, broadcasts are sent 3 times after 30 sec. to VLAN and after two minutes to LAN.

Disable IP set in Scan ODU Disables IP address setting via Scan ODUs.

Forgot your password? To clear the password, follow the steps in section 3.3. **Important!** If **Disable IP SET in Scan ODUs** is activated during the password clearing process, the device also needs to be restarted (by connecting and disconnecting the device from the power supply) for security reasons.

7.2 VLAN settings

Enable VLAN	Enables device management for VLAN.
VLAN priority tag	Priority setting according to the 802.1p protocol (a 3-bit flag in packet 0-7).
VLAN CFI	Enables the CFI flag.
	CFI enable: Device management can only be accessed from VLAN (depending on the set VLAN ID).
	CFI disable: Management can be accessed from both VLAN and the default LAN.

VLAN ID	VLAN number.
----------------	--------------

7.3 SNMP settings

The device can be monitored using the SNMPv1 protocol. Simply check the **Enable SNMP** option in SMS and fill in the **SNMP read Community string** field for authentication, see Figure 24.

Enable SNMP	Enables the SNMP protocol.
SNMP Read Community string	Authentication password.
SNMP SYS Location	The physical location of the device.
Change NAME to SYS LOCATION in Scan ODUs	Toggles the display name in Scan ODUs (between “device name” and the name specified in SYS LOCATION).

Note: A **.mib** file or a CACTI **.XML** template for the SUMMIT device can be downloaded at www.summitd.cz/download/.

7.4 Password-protecting the unit

Communication with the device can be encrypted in order to prevent usage by unauthorized persons (128-bit encryption is used to secure device settings). Both a read/write and a read communication password can be

set, see Figure 25. The password then needs to be entered in a field on the main control panel (under the IP address field). In that field, right double-click to mask the password as *****).



The screenshot shows a configuration window titled "Management IP security password". It features a red progress bar for "Password Quality" at 100%. Below it is a text input field for "Password" with the text "AskMeForMyPassword.". A checkbox labeled "Enable read password" is checked. At the bottom is another text input field for "Read password".

Figure 25

Password Quality	The quality of the password (we recommend using a combination of both uppercase and lowercase letters and numbers).
Password	A password for communicating with the device (read/write).
Enable read password	Enables setting a read-only password.
Read password	Sets a read password.

Rx Jabbers packets	The number of Jabbers packets received (packets that were longer than 1518 bytes and contained a bad CRC).
Rx Symbol Error packets	Packets containing a symbol error (encoding (4,5)).
Rx CRC Error packets	Packets with an incorrect checksum.
Rx Alignment error packets	The total number of bits in the frame received is not divisible by eight.
Rx Control (8808) packets	The number of 8080-type control (non-data) packets.
Rx Dropped pck (no res.)	The number of packets dropped. The error was due to an input buffer overflow. This error can be eliminated by introducing Shaping or by enabling Flow Control.

8.2 Ethernet Module Statistic - Transmit

Statistics for packets transmitted from the Ethernet interface of the SUMMIT device to the Ethernet network.

Tx Lo Priority byte	The number of packets transmitted, in bytes (except for higher-priority packets).
Tx Pause packets	The number of Pause packets transmitted.
Tx Broadcast	The number of Broadcast packets transmitted.
Tx Multicast	The number of Multicast packets transmitted.
Tx Unicast	The number of Unicast packets transmitted.
Tx Total Collision	The number of collisions in the medium.
Tx Excessive Collision	The number of packets dropped (packets that failed to be transmitted even after the 16 th collision).
Tx Single Collision	Packets that were preceded by 1 collision.
Tx Multiple Collision	Packets that were preceded by 2-15 collisions.
Tx Late Collision	The number of packets dropped (due to collision being detected late).
Tx Dropped pck. (no res.)	The number of packets dropped.

8.3 Ethernet Module Statistic - Remote

Statistics between the Ethernet module and the Digital Signal Processor (DSP).

TX byte	The number of bytes transmitted.
TX packet	The number of packets transmitted.
RX byte	The number of bytes received.
RX packet	The number packets received.
RX error	The number of errors.

Error rate in these packets indicates a fault on the device. The issue is resolved by the manufacturer of the device.

8.4 Ethernet DSP Statistic

Statistics on the DSP (i.e. on the radio).

Tx byte	The number of bytes transmitted.
Tx byte dropped	The number of bytes dropped.
Tx packet	The number of packets transmitted.
Tx packet dropped	The number of packets dropped.
Tx High P. byte	<i>Not implemented.</i>
Tx High P. byte dropped	<i>Not implemented.</i>
Tx High P. packet	<i>Not implemented.</i>
Tx High P. packet dropped	<i>Not implemented.</i>
Rx byte ok	The number of bytes received.
Rx byte error	The number of bytes received with an error.
Rx packet ok	The number packets received.
Rx packet error	The number packets received with an error.
Elapsed time	The time that has elapsed.

9 CHECK LINKS

The **Check Links** page is used for monitoring and checking multiple SUMMIT links, see Figure 27. The table displays each link as a double row with lighter and darker background. For the selected link (double row), the background colour changes to blue. Information in the table that is shown in yellow indicates a warning (poor-quality links). Information in the table that is shown in red indicates critical link status.



Figure 27

Add

Adds a link to the table. Enter both sides' IP addresses and passwords (if any) in the **Add RL link** window, see Figure 28.

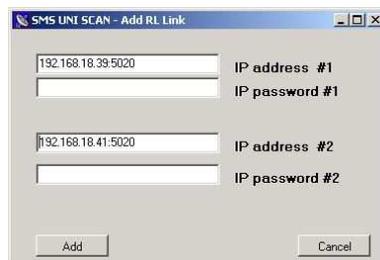


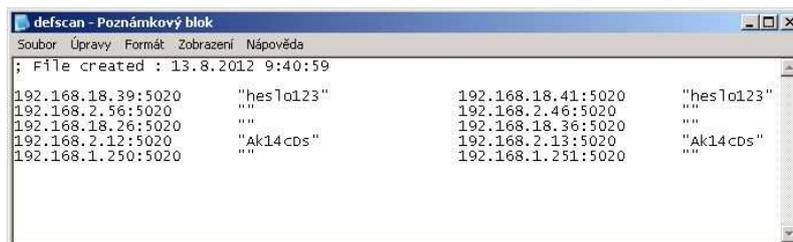
Figure 28

Load

Loads a text file containing pre-defined links, see Figure 29. The file contains the IP addresses and passwords for the different links (one row = one link). Empty rows are allowed in the text file, comments are marked with a semicolon.

Structure:

IP ADDRESS 1 "PASSWORD 1" IP ADDRESS 2 "PASSWORD 2"



```

; File created : 13.8.2012 9:40:59
192.168.18.39:5020      "hes1o123"      192.168.18.41:5020      "hes1o123"
192.168.2.56:5020     ""              192.168.2.46:5020     ""
192.168.18.26:5020    ""              192.168.18.36:5020    ""
192.168.2.12:5020    "Ak14cDs"      192.168.2.13:5020    "Ak14cDs"
192.168.1.250:5020   ""              192.168.1.251:5020   ""

```

Figure 29

Save	Saves the current list of links defined in the table to a txt text file.
Edit	Allows for editing the selected link's address and password.
Del	Deletes the selected link from the list of links.
Find	Searches for a link by entering the IP address and port.
Enable Scan	Enables scanning the links defined in the table.
Scan Rate [min]	The rate at which the entire list is scanned in minutes. The value indicates how often the link list in the table should be scanned (the maximum scan rate for one link is one second. That means that scanning e.g. 120 links requires at least 2 minutes).
Load last state	Allows for the last list of links in the table to be reloaded when the SMS program reopens.
# of RL Links	The number of links in the table. The sequence number and IP address of the link that is being scanned are displayed above this label.
Name	The name of the device.
C	The condition of the device. warn - Warning (yellow background) err - Link is critical (red background)
#	The serial number of the device.
IP Addr	The IP address of the device (if the IP address is preceded by the e symbol, this indicates that the model of the device has an E1 interface)
Pass	Device password protection (if * is displayed, the unit is password-protected).
Status	The status of the device.
Eb/No	Signal quality.
Berr	Error rate of the link.
Plost	The number of packets lost.
Old	The time since receiving the last broadcast from the unit (i.e. how old unit information is).

The links can be sorted by any column parameter. Clicking the column name displays the **>** or **<** character. **>** sorts the values in the column in descending order. **<** sorts the values in the column in ascending order.

When sorting the list, the links (double row) rather than separate radio units (single row) are sorted. We recommend sorting by column **C >** (poorest links are displayed at the top).

10 SPECTRUM ANALYZER

The spectrum analyzer (SA) that is integrated in the device is used to search for a free channel. The SA consists of a portion of the radio receiver, which is why the link radio is disconnected during recording and no data is transmitted. Once recording is completed, the link's operation is restored within approximately 15 sec. The spectrum can be measured from both the local and the remote sides (provided that the link is connected).



Figure 30

SCAN	Starts scanning the frequency spectrum.
Red curve	The measured spectrum.
Blue curve	The indicative distribution of the channels 28 Hz / 14 MHz / 7 MHz / 3.5 MHz.

11 E1

The E1 standard for transmitting 32 channels at a bitrate of 64 kbit/s per channel (the bitrate for all 32 E1 channels is 2048 Mbit/s). The page shows an overview of E1 and is used for settings and diagnosing E1, see Figure 31.

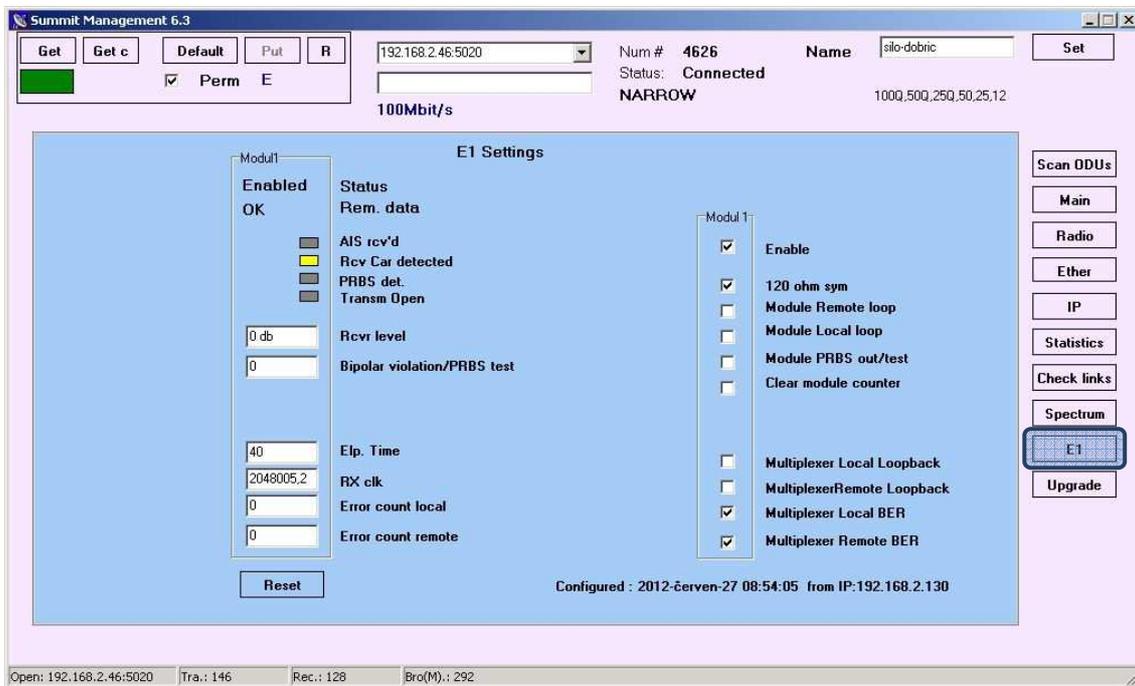


Figure 31

11.1 E1 settings and status

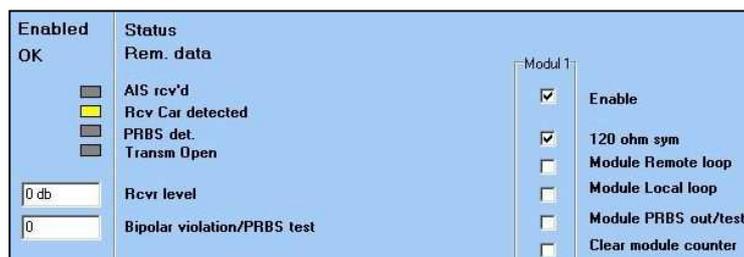


Figure 32

Enable	Enables the E1 module (must be checked on both sides of the link). If the module is enabled but not used, it still uses up a part of the transmission capacity!
120 ohm sym	If checked, a 120 ohm balanced cable is set to be connected. If unchecked, a 75 ohm unbalanced cable is set to be connected.
AIS rcv'd	Detects alarm signal from a connected device (e.g. a switchboard).
Rcv Car detected	Detects input signal.
PRBS det.	Detects a pseudo-random binary sequence (test sequence).

Transm Open	Detects a disconnected output or an output, whose impedance has not been adjusted, on the E1 module.
Rcvr level	Detects input signal [dB].
Bipolar violation/PRBS test	<ol style="list-style-type: none"> 1. If the PRBS det. indicator is unlit, errors in incorrectly coded signal to the HDB3 line code (deviations from HDB3 code) are detected. 2. If the PRBS det. indicator is lit, the test binary signal error rate is detected.

11.2 Diagnostics

Any connection issues can be resolved using the built-in testers within the device and the diagnostic methods that can be set in SMS, see Figure 33.



Figure 33

Module Remote loop	A loop on the module towards the radio (data received from the remote side are sent back to the remote side).
Module Local loop	A loop on the module towards the interface (data received from the interface are sent back to the interface).
Module PRBS out/test	Generates a PRBS test sequence.
Clear module counter	Resets the Bipolar violation/PRBS test counter.
Multiplexer Local Loopback	A loop on the multiplexer towards the interface (data received from the interface are sent back to the interface).
Multiplexer Rem. Loopback	A loop on the multiplexer towards the radio (data received from the remote side are sent back to the remote side).
Multiplexer Local BER	Built-in tester to measure the error rate (assuming loopback on the local side - a loopback connector, or a loopback mode on the connected device).
Multiplexer Remote BER	Built-in tester to measure the error rate (assuming loopback on the remote side - a loopback connector, or a loopback mode on the connected device).
Elp. Time	Elapsed Time.
RX clk	Frequency [Hz].
Error count local	Error counter (towards the local side).
Error count remote	Error counter (towards the remote side).
Reset	Resets the counters.

12 UPGRADE

The page is used to upgrade the DSP, CPU and PVG, see Figure 34. To upgrade the firmware, upload the upgrade files (available from www.summitd.cz/download) to the directory from which you run SMS. Then start SMS, select **Upgrade** and left click to select **Upgrade CPU**, **Upgrade DSP** or **Upgrade PVG**. We recommend upgrading the link's remote side first and local side second. After upgrading PVG, check the channel bandwidth setting!

While uploading the program, uninterrupted power supply to the device must be ensured! Otherwise, the manufacturer is not liable for any resulting damages.

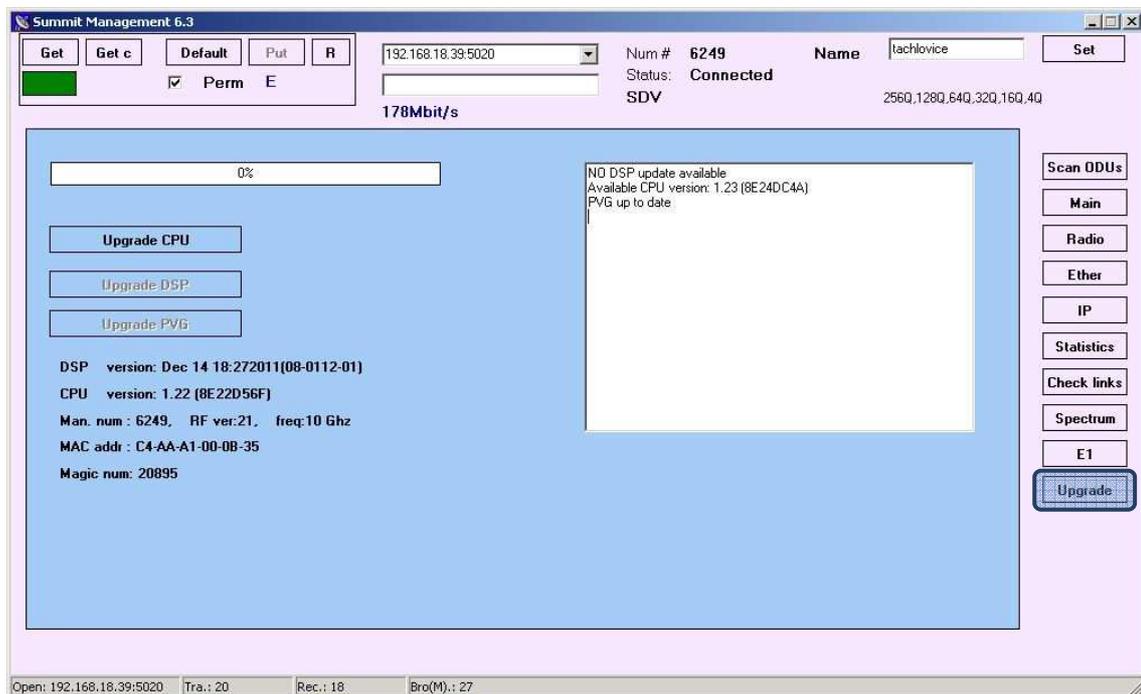


Figure 34

Upgrade CPU	Upgrades the program's CPU.
Upgrade DSP	Upgrades the program's DSP.
Upgrade PVG	Upgrades the program's PVG.