



CFM-34-SWB

E1 1+1 Indoor Unit

Installation and Configuration Manual

Software Version 1.00

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Table of Contents

1	Introduction	3
1.1	Protected Link Configuration	3
2	Hardware Features	4
2.1	IDU Appearance	4
2.2	Mechanical Data	6
2.3	Functional Description	7
2.4	Fast Ethernet Switch	9
2.5	Labelling.....	9
3	Management Interfaces.....	10
3.1	LCD/Keypad	10
3.1.1	“Status Display” Mode of the LCD Management Interface	10
3.1.2	“Setup” Mode of the LCD Management Interface.....	11
3.2	Reset Functions	13
3.3	RS-232 Serial Management Port.....	14
3.3.1	Command Line Interface for Telnet/ASCII Consoles.....	17
3.3.2	Description of commands	21
3.4	Ethernet Management Port.....	24
3.4.1	SNMP Interface.....	24
3.4.2	Web Interface.....	26
3.5	Algorithm of LCD Operation	28
3.6	Updating Management Software.....	29
3.7	Default Settings.....	29
4	Pinouts	31
5	Installation and Setup	33
5.1	Installation Summary	33
5.2	Procedure 1: Physical Installation	33
5.3	Procedure 2: Configuring IP addresses	34
5.4	Procedure 3: Configuring Routing via Management Console	37
5.5	Procedure 4: Configuring SNMP Parameters	38
5.6	Configuration script example	39
6	SAF Tehnika A/S Contacts	41
7	References	42
7.1	Technical Descriptions	42
7.2	Configuration Guide	42
7.3	Management Software Update Guide	42

1 Introduction

Proprietary notice

The specifications or information contained in this document are subject to change without notice due to continuing introduction of design improvements. If there is any conflict between this document and compliance statements, the latter will supersede this document.

This document describes the CFM series E1 1+1 Switch Box Indoor Unit (SWB IDU) covering the built-in management system, configuration functionality, hardware features, etc.

The E1 1+1 SWB IDU is part of SAF Tehnika's CFM series digital microwave radio product family providing:

- Means of interconnecting the user equipment with two CFM series E1 Indoor Units each of them terminating independent radio link; All CFM E1 IDUs (two on each side) terminate equal number of E1 channels;

The CFM-34-SWB IDU is intended for use with the following CFM series E1 Indoor Units: CFM-4-2E1, CFM-8-4E1, CFM-16-8E1 and CFM-34-16E1. The SWB IDU can also be used with the CFM series modular multiplexer IDUs and modular fast Ethernet bridge IDUs supplemented with E1 modules.

Note: the CFM-34-SWB IDU has RJ-45 traffic port connectors. If E1 IDU has other traffic port connectors (e.g., BNC or SMB), an appropriate transition equipment may be required (like SAF Tehnika's offered BNC-RJ45 Balancing Unit).

- Local management functionality.
- 5-port 10/100M Fast Ethernet Switch.

1.1 Protected Link Configuration

The protected terminal (1+1) configuration consists of one Protected Switching unit (SWB IDU) on each side, two E1 IDUs on each side and two Outdoor Units (ODUs) connected to both E1 IDUs on each side (see Figure 1).

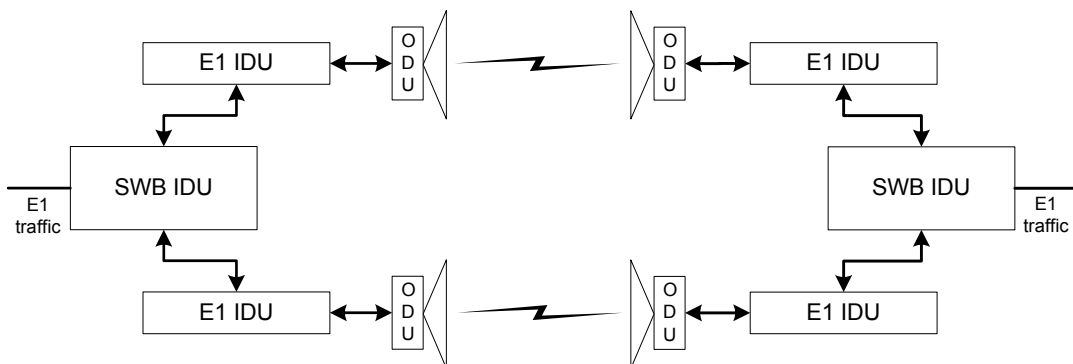


Figure 1. Protected terminal configuration

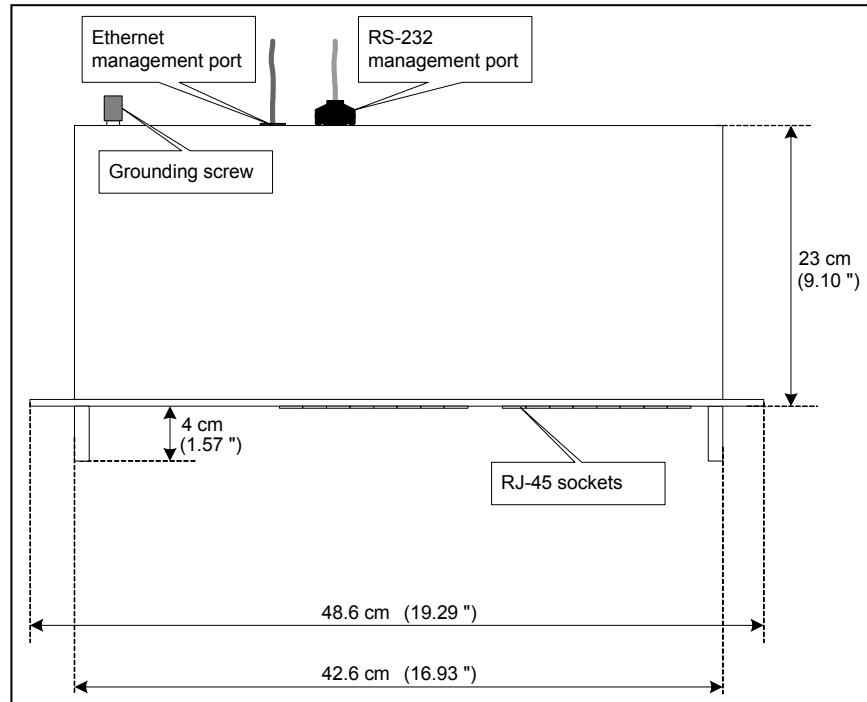
Depending on the path protection used, only one antenna can be used on each side (frequency diversity).

This document covers versions **1.00** and above for the management controller software of the SWB IDUs.

2 Hardware Features

2.1 IDU Appearance

The SWB IDU is implemented as 19" rack mountable aluminium 2U high unit, the depth of the unit is 230 mm without front panel handles and 270 mm with handles.



The **CFM-34-SWB** IDU provides protection switching between two CFM E1 IDUs, which include CFM-4-2E1, CFM-8-4E1, CFM-16-8E1, CFM-34-16E1 IDUs, and modular multiplexer IDUs with E1 traffic ports.

The **CFM-34-SWB** IDU is available in two versions:

- With RJ-45 traffic port connectors (Figure 2)
- With DB25 traffic port connectors, 4 E1 ports per DB25 connector (Figure 3)

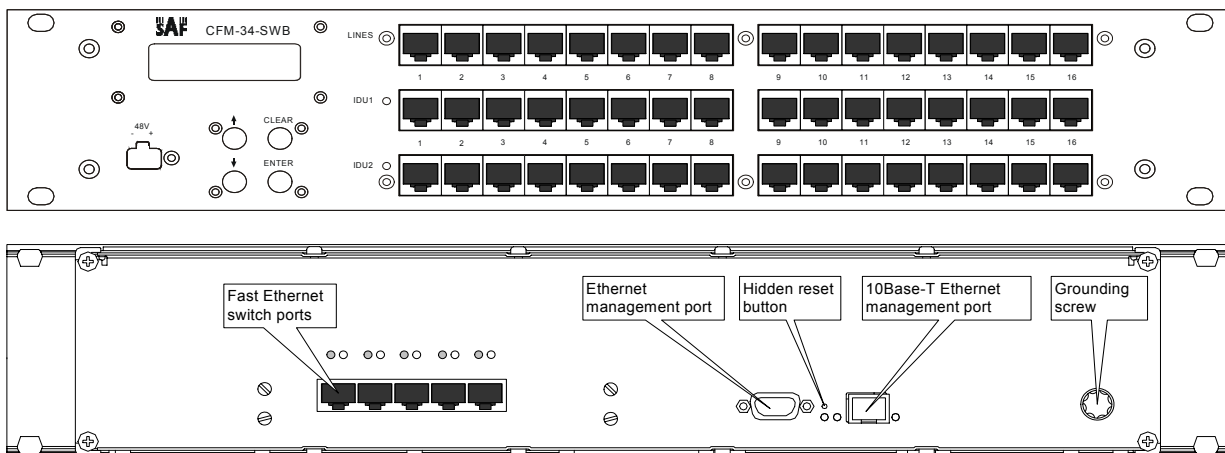


Figure 2. The CFM-34-SWB IDU with RJ-45 E1 port connectors (front and rear panel)

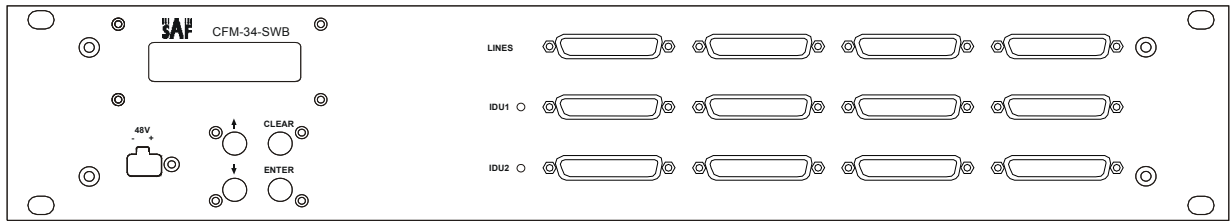


Figure 3. The CFM-34-SWB IDU with DB-25 E1 port connectors (4 E1 ports per one DB25 connector)

The CFM-34-SWB IDU provides the following interfaces:

- E1 traffic ports with 2 Mbps throughput per each;
- RS-232 serial management port;
- 10Base-T Ethernet management port for Web or Telnet console, or SNMP management terminal;
- LCD/keypad;
- Port activity LEDs.

Table 1. Connectors

Connector(s) / label	Comments
Front panel connectors	
+ - 48V	Power connector (D-sub type), IDU should be powered from 20 – 60 VDC power source. Either “+” or “-” pole of the power source can be grounded, one should make sure if the chosen grounding wire is connected to ground on IDU power connector.
LINES (RJ-45 sockets in upper row)	E1 interface ports, the user equipment are connected to these ports.
RJ-45 sockets in two lower rows	The E1 traffic ports where IDUs are connected.
Rear panel connectors	
DB-9 type connector	RS232 management port for connection of ASCII console (or analog line modem for the remote connection of ASCII console); The RS232 console port is also used to update management software.
RJ-45 socket	10Base-T Ethernet management port, this port is used to connect Telnet or Web terminal.

Table 2. LEDs

Label(s)	Comments
Front panel LEDs	
IDU1	Indicates that the E1 traffic is being received from IDU 1 ("IDU2" LED is off)
IDU2	Indicates that the E1 traffic is being received from IDU 2 ("IDU1" LED is off)
Rear panel LEDs (see Figure 4)	
A	If blinking (with a period of about 1 sec.), indicates operation of the management module CPU;
B	If lit, indicates that Ethernet link is established with the management terminal;
C	If blinking, indicates that packets are transmitted between the IDU and the Web or Telnet or SNMP management terminal;
D	Link Active LED (green), it is lit when port is connected to Ethernet correctly; it is blinking when packets are transmitted or received via the port.
E	100Mbps LED (yellow), it is lit (constantly) when port operates with the speed of 100 Mbps; if the LED is not lit, the port operates with the speed of 10 Mbps.

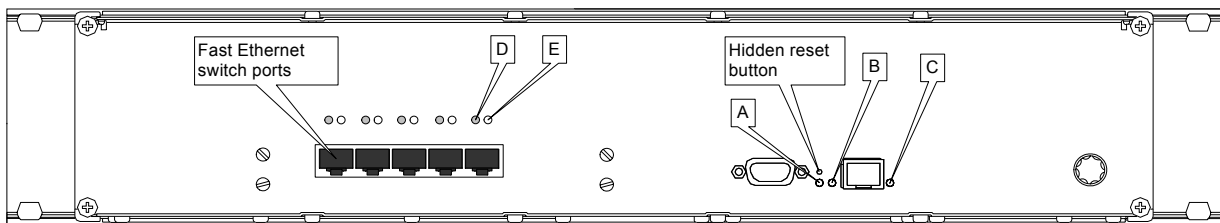


Figure 4. The rear panel LEDs

2.2 Mechanical Data

Weight, kg	Dimensions HxWxD, mm
2.1	88x482x284

2.3 Functional Description

The protected link can operate in one of three modes:

1. *Far-end Independent Mode*, - in this mode there must be two independent links operating simultaneously in parallel (Figure 5); Both links operate in different frequency channels, transmitters of all ODUs (two on each side) are permanently switched on.

The transmit and receive traffic flows are treated independently; the SWB IDU sends the traffic signal to both E1 IDUs to the far-end, at the the far-end site the incoming traffic signal is selectively received from one of E1 IDUs and then commutated to the user equipment.

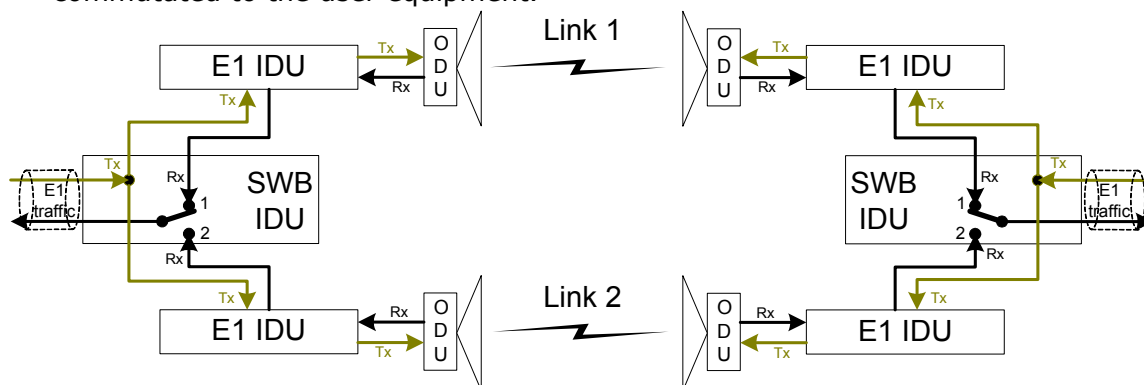


Figure 5. Far-end Independent traffic switching mode

The fault detection is carried out as follows: to decide either to perform switchover or not, the SWB periodically polls both local IDUs receiving data about both local terminals (IDU+ODU). This data contains reports on the RA and SL alarms and RL parameters and decision is made on the basis of this information, see Chapter 3.1.2 for more detailed information about alarms and RL parameters. The SWB IDU sends the outgoing traffic (Tx) to both terminals connected to it. As for the incoming traffic (Rx), if a fault occurs in any of the local terminals (e.g., Rx level too low), the SWB IDU switches over to receive traffic from other terminal.

The local SWB IDU also sends user-information request via service channel to the remote SWB IDU to collect and return data about both remote terminals, this data does not affect 1+1 switching but are only intended to inform user.

This operational mode is suited for protected systems implementing **frequency diversity**.

2. Far-end Dependent Mode.

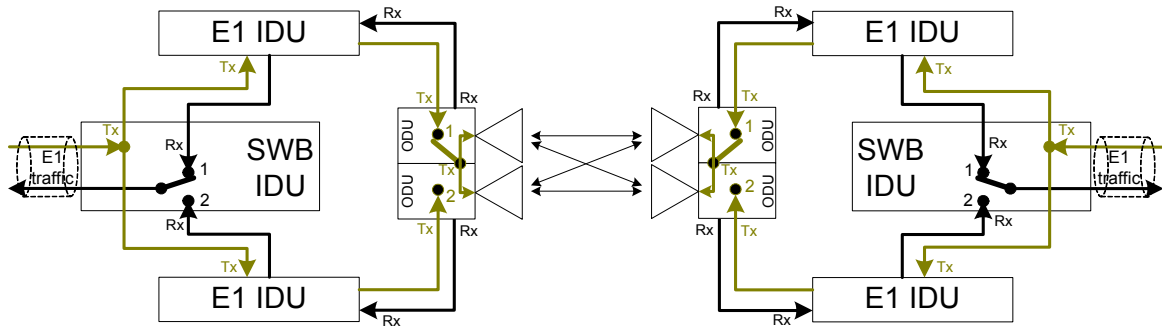


Figure 6. Far-end Dependent traffic switching mode

In *far-end dependent* mode two links operate in parallel in the same frequency channel, only one ODU on each end transmits the outgoing traffic, the transmitter of the other ODU is switched off. In the receive direction two antennas are used that are each fed to their respective receivers, one transmitter and two receivers work in each direction. The SWB IDU selects the incoming (Rx) traffic signal from one of E1 IDUs, and then commutates it to the user equipment.

The transmit and receive traffic flows are treated independently. Apart from user-information requests, both the local and the remote SWB IDUs periodically send status information to the far-end SWB unit, the status information tells which ODU is active and whether SL and RF alarm is switched on. In case if due to some fault the outgoing traffic flow is interrupted (for example, transmitter of the near-end ODU fails), the far-end SWB IDU will notify in the current status information message via service channel to the near-end SWB IDU that none of the far-end ODUs receive data and in consequence of that at the near-end the signal transmission will be switched to other ODU, i.e. - the transmitter of the current ODU at the faulty site will be switched off and the transmitter of the second ODU will be switched on. The incoming traffic signal is locally switched between IDUs in the same manner like in the *far-end independent* mode, i.e., on the basis of RA, SL and RL parameters (see Chapter 3.1.2 for details about RL parameters).

3. *Far-end dependent fast mode*, this mode is similar to *Far-end dependent* mode but with disabled far-end SWB IDU polling, meaning that the SWB IDUs do not send any user-information requests each other, hence this may minimize the switchover time. This is the default operational mode.

The typical **switchover time** (i.e. time when the SWB IDU switches the incoming and/or outgoing traffic from one E1 IDU to other) is **2 seconds**, the maximum switchover time is **5 seconds**; the switchover time varies depending on the type and location of failure.

The SWB IDU communicates with two local E1 IDUs and the far-end SWB IDU via SNMP; the following parameters must be specified for each SWB IDU for the management network to work properly:

- IP address of the local SWB IDU Ethernet management port
- IP address of the remote SWB IDU Ethernet management port
- IP address of the local E1 IDU Ethernet management port for link 1
- IP address of the local E1 IDU Ethernet management port for link 2
- SNMP community name (for the near-end SWB IDU)
- Far-end SWB IDU community name
- SNMP community name of the near-end E1 IDU for link 1
- SNMP community name of the near-end E1 IDU for link 2

For management traffic the E1 IDUs are connected to the SWB IDU via Ethernet (see Figure 7); it is recommended to use the high reliability network for interconnection of the IDUs as any management traffic network problems like congestions or improper configuration will affect the SWB IDU response time to faults. Typically two E1 IDUs could be connected to the SWB IDU using a hub.

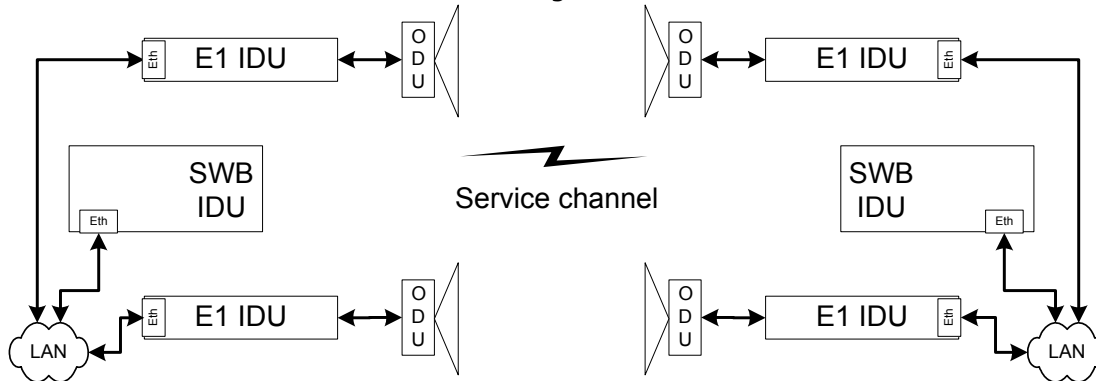


Figure 7. Shaping SNMP management network

The switching between *far-end dependent* and *far-end independent* modes is available from Telnet or ASCII management consoles only.

2.4 Fast Ethernet Switch

The SWB IDU has integrated 5-port 10/100Mbps Fast Ethernet switch. The switch has the following features:

- Supports Auto MDI-X. The switch can be connected to any network device with any cat. 3 or cat. 5 cable;
- Auto negotiation for any port;
- Data forwarding rate per port at wire-speed 100 Mbps or 10 Mbps;
- 1K MAC address entries table per device;
- 1 MBits RAM buffer per device.

The Fast Ethernet switch complies with IEEE802.3 / IEEE802.3u standard.

2.5 Labelling

The IDU label is found at the rear panel:

- P/N – product number, the last two numbers denote the product version;
- S/N – serial number.



Figure 8. Labels of the CFM-34-SWB Indoor Unit

3 Management Interfaces

3.1 LCD/Keypad

LCD and keypad provides most basic method to locally configure and monitor the local CFM terminal (IDU+ODU).

LCD display is constantly backlight and is able to display 2 lines of 16 symbols in each line.

The LCD operates in two modes - **Status** and **Setup** display mode, please refer to Flow Chart 1, page 28.

Keypad consists of 4 buttons:

ENTER is used to confirm the choice of displayed item or entered data as well as to switch from "status display" to "setup" mode.

CLEAR is used to cancel the choice or to move to previous menu level

↑ ↓ Up/Down buttons are used:

- To switch between options for menu items displayed

- To choose parameter to set up and to set its value.

3.1.1 "Status Display" Mode of the LCD Management Interface

Once the IDU is powered up, it automatically enters "Manual Display" mode, displaying two parameters at a time statically (use up/down buttons to scroll through parameters). These parameters are listed in the Table 3.

Table 3. Parameters displayed in "Status Display" mode

Parameter	Values and description
Rf Lev. 1 -70 dBm Rf Lev. 2 -70 dBm	Parameters indicate level of the received signal, values from -40 dBm to -90 dBm provide proper operation of the system (1 – for the link 1, 2 – for the link 2).
RA Alarm 1 Off RA Alarm 2 Off	Indicates status of the Radio Alarm for link 1 and 2 (On or Off).
SL Alarm 1 Off SL Alarm 2 Off	Indicates status of the Sync Lost alarm for link 1 and 2 (On or Off).
Active Send 2	Indicates to which E1 IDU the traffic is currently being sent. Note: this is indication in displayed in <i>far-end dependent</i> mode only.
Active Receive 2	Indicates from which E1 IDU the traffic is currently being received. Note: this is indication in displayed in <i>far-end dependent</i> mode only.
Active Link 1	Indicates currently active link; Note: this indication is displayed in <i>far-end independent</i> mode only.

3.1.2 "Setup" Mode of the LCD Management Interface

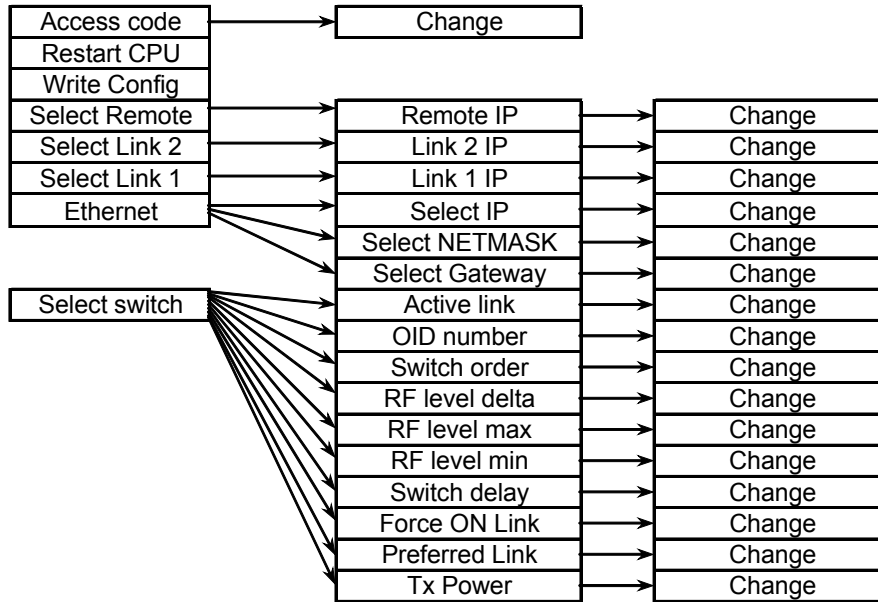
The following table describes parameters available for change from the IDU LCD in **Setup** mode. Algorithm of LCD operation is shown on Flow Chart 1, page 28.

Table 4

Parameter	Values and description														
Access Code	Specify the panel access code (a number from 0 – 200) that was set up from Telnet or ASCII console to enable any adjustments from IDU.														
Restart CPU	Restarts management module CPU for the new IP settings to take effect. Resets all management counters.														
Write config	Saves all settings in EPROM of management controller.														
Remote IP	Sets the IP address of the remote SWB IDU management module (far-end terminal).														
Link 1 IP Link 2 IP	Sets the IP address of the E1 IDU Ethernet management port of link 1 and 2.														
Select IP Select NETMASK Select Gateway	<p>IP and NETMASK – IP address and netmask of the Ethernet port of the management controller (default IP address - 192.168.205.010 or 192.168.206.010, default netmask 255.255.255.000)</p> <p>Gateway – IP address of the management console (Web or Telnet) directly connected to the Ethernet management port or the IP address of the gateway if the console is connected via network (indirectly), the default value is 255.255.255.255 (no gateway specified).</p> <p>IP, Netmask and Gateway parameters provide the means of addressing the IDU management controller in order to control and manage IDU locally and monitor ODU both locally and remotely.</p> <p>Note: It is necessary to restart the management CPU for any changes in IP settings (including SNMP terminal and service channel IP settings) to take effect.</p>														
Active link 1	Change currently active link (1 or 2). The switchover is carried out by commutating E1 traffic ports between link 1 and link 2 within the SWB IDU.														
OID number 13	<p>Change SNMP OID number of the SWB IDU (1 – 63): enter the values according to this table:</p> <table border="1"> <thead> <tr> <th>IDU type</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>CFM-4-2E1 (2 x E1 ports)</td> <td>14</td> </tr> <tr> <td>CFM-8-MUX (modular IDU with 1xE1 modules)</td> <td>1</td> </tr> <tr> <td>CFM-8-4E1 (4 x E1 ports)</td> <td>16</td> </tr> <tr> <td>CFM-16-8E1 (8 x E1 ports)</td> <td>10</td> </tr> <tr> <td>CFM-34-16E1 (16 x E1 ports)</td> <td>13</td> </tr> <tr> <td>CFM-34-REBM</td> <td>2</td> </tr> </tbody> </table>	IDU type	Value	CFM-4-2E1 (2 x E1 ports)	14	CFM-8-MUX (modular IDU with 1xE1 modules)	1	CFM-8-4E1 (4 x E1 ports)	16	CFM-16-8E1 (8 x E1 ports)	10	CFM-34-16E1 (16 x E1 ports)	13	CFM-34-REBM	2
IDU type	Value														
CFM-4-2E1 (2 x E1 ports)	14														
CFM-8-MUX (modular IDU with 1xE1 modules)	1														
CFM-8-4E1 (4 x E1 ports)	16														
CFM-16-8E1 (8 x E1 ports)	10														
CFM-34-16E1 (16 x E1 ports)	13														
CFM-34-REBM	2														
Switch order sl ra rl	<p>Specify the conditions and their polling order that may initiate switchover; the following events are periodically polled for each link (sl – Sync Lost, ra – Radio Alarm, rl – Rx level, the "rl" item covers the following "sub-events" to be checked: <i>RF level delta</i>, <i>RF level max</i> and <i>RF level min</i>)</p> <p>Note: if both IDUs report the same alarm or condition, no switchover is performed.</p>														

RF level delta	Sets the difference between link 1 RX signal level and link 2 RX signal level which, when exceeded, causes to switch to the other link with the higher RX signal level unless the conflict with the "RF level max" parameter subsist. This parameter can be changed from 2 to 30 dB.
RF level max	Sets the maximum RX signal level which, when exceeded, causes to switch to the other link unless the conflict with the "RF level max" or "RF level min" parameters subsist. This parameter can be changed from -2 to -70 dBm.
RF level min	Sets the minimum RX signal level, - if the RX signal appears below it, the other link is activated unless the conflict with the "RF level max" or "RF level min" parameters subsist. This parameter can be changed from -10 to -110 dBm.
Switch delay	Sets the time between switch-over attempts (5 – 900 seconds).
Force ON Link	<p>In <i>far-end independent</i> mode this option forces the link (1 or 2) to be active ignoring any condition(s) that could cause to switch over to other link. Off – no link is forced.</p> <p>In <i>far-end dependent</i> mode this option forces to transmit E1 traffic from the local site 1 or site 2 ([IDU 1 and ODU 1] or [IDU 2 and ODU 2]) and receive E1 traffic from the same local site.</p>
Preferred Link	Sets the default link (1 or 2), this link will be active after equipment reboot.
Tx Power	<p>This option works in <i>dependent</i> and <i>dependentfast</i> operation modes only.</p> <p>Sets the transmitter power of the currently active (transmitting) radio of the local protected site. If the operation mode is set to independent, the Tx power adjustments are ignored. This changes the Tx Power setting for <i>both</i> local ODUs, but only one ODU is transmitting at a time, the transmitter of the other ODU is switched off.</p> <p>Important! The transmitter output power for ODU 1 and ODU 2 of the local protected site should be configured from the SWB unit. For proper operation of the link, avoiding interference of the adjacent Radio unit, the transmitter output power must be set at least to 10 dBm level. Changing this setting will adjust the transmitter output power of the currently active Radio unit to the specified power level. The transmitter of the other (inactive) Radio unit will remain switched off.</p>

Setup mode menu tree



3.2 Reset Functions

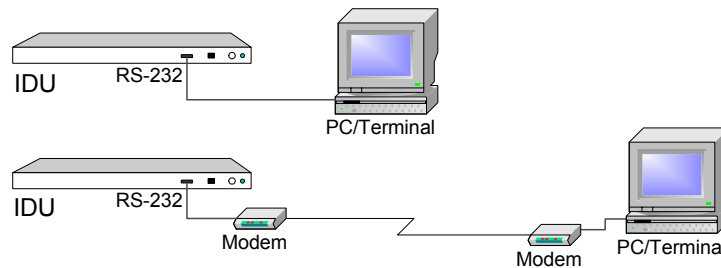
Depending on the method used, the user may reset the whole terminal (IDU+ODU) or the management controller individually, see table below for details.

Reset through the LCD menu system using "Restart CPU" option or from the Telnet/ASCII console using "restartcpu" command	Restarts the management module. Resets all management counters.
Reset action using hidden button at the rear side of the IDU (see Figure 4)	Restarts both the multiplexer module and the management module. Resets all management counters. Note: This may require a pin, at least 15 mm long, approx. 1.5 mm in diameter.
Unplugging of power supply	Restarts the multiplexer module and the management module. Resets all management counters.

3.3 RS-232 Serial Management Port

The RS-232 serial management port provides terminal management via connected PC or other terminal device or modem.

The terminal connected to the serial management port provides the same management functionality as Telnet interfaces (refer to Command Line Interface). In order to interconnect the IDU and the management terminal directly through serial ports, a "straight through modem cable is needed.



If using modems, the management terminal is connected with the IDU remotely through a telephone line. In this case the modem, which is connected with the IDU should be set to *Auto Answer* mode.

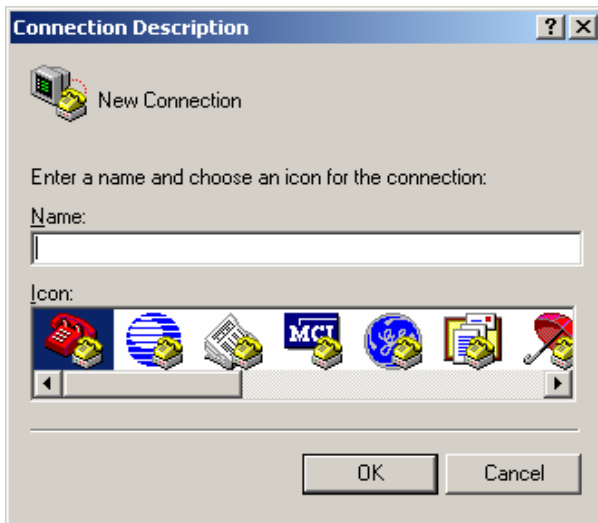
```
c:\ Telnet 192.168.205.12
Telnet server. Press CTRL/D to end session
Login: telnet
Password:
SAF komut>?
Valid commands:
  enable disable disableWDT exit ip link link1 link2
  cfg mac name ping panel resetWDT restartcpu route snmp
  switch time txpower ver write webrefresh wwwuser telnetuser
SAF komut>link1 ?
valid subcommands: community WriteCommunity ip stat remotestat
SAF komut>link1 stat
Link 1 Status : On
Rx Level      : -59 dBm
RF Alarm      : On
Sync Lost Alarm: Off
SAF komut>_
```

Telnet management window

In order to connect the console to the Radio via RS-232 interface, the serial port of the management console should be configured as 19200 8-N-1, no data flow control.

In order to connect the PC to the RS232 management port using *Hyper Terminal* program (this program is included in any Windows version), proceed as described below.

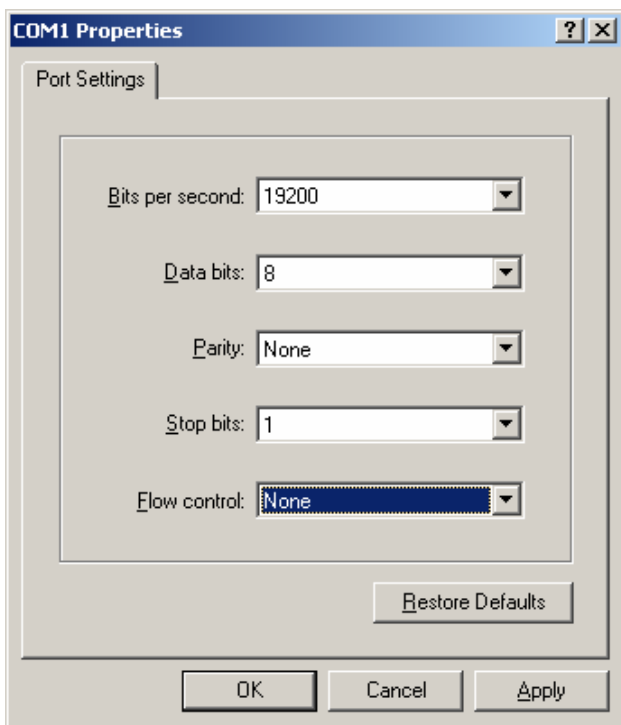
1. Connect PC to the RS232 serial port by means of "straight through" or modem serial cable (null-cable).
2. Run "Hyper Terminal" program.
3. Make a *New connection*, enter connection name.



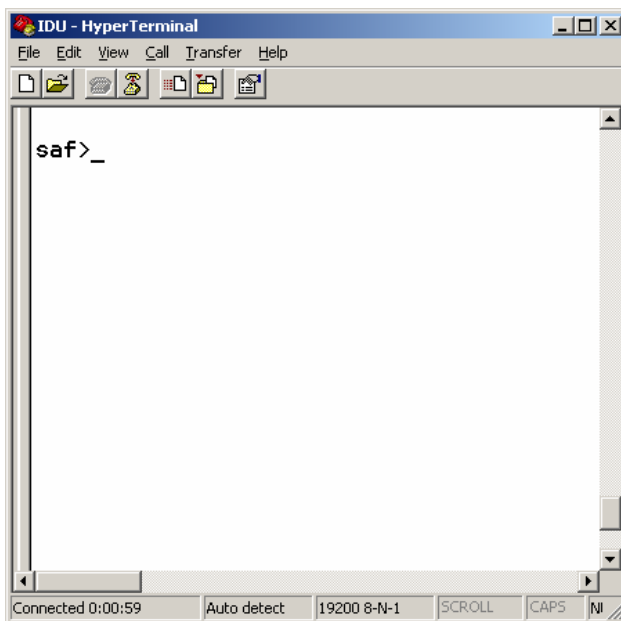
4. Choose port (COM1 or COM2).



- Set port settings (bits per second: 19200, data bits: 8, parity: none, stop bits: 1, data flow control: none).



- Press OK
- Press Enter. Password is disabled by default.
If successfully connected, the prompt should appear as in the picture below. See Chapter 3.3.1 for available commands.



3.3.1 Command Line Interface for Telnet/ASCII Consoles

The command line management interface offers the widest configuration and monitoring functionality. The following tables summarize all available commands for Telnet and ASCII management terminals.

Common commands	
Command	Description
Time	Show current date and time.
Time <YYYY-MM-DD HH:mm:ss>	Set the date and time on the IDU. Refer to section <i>Real-time clock</i> , page 22.
Name <deviceName>	Assigns a name to the IDU; The default name is "SAF". Refer to section <i>IDU name</i> , page 21.
Write	Save all settings in the EPROM. This command saves all current settings in EPROM, including those in the script.
Ping <IPaddress>	This command is for troubleshooting purposes to verify the service channel connectivity, - sends a special packet to the remote IDU and then waits for a reply.
Webrefresh <refreshperiod>	Refreshes the contents of WEB interface with a period specified with <i>refreshperiod</i> parameter. The period is given in seconds; the minimum period is 2 seconds. Example: <i>webrefresh 5</i> - the web page will be updated after every 5 seconds.
DisableWDT	Disable watchdog timer.
ResetWDT	Reset watchdog timer (restarts management controller, resets all management counters).
ClearCounters	Reset up-time and down-time counters, see page 20 for details.
Exit	Close Telnet session (same as to press Ctrl+D)
Disable {telnet www snmp rip}	"telnet" - Disable Telnet interface "www" - Disable Web interface "snmp" - Disable SNMP interface "rip" - Disable RIP Note: after the command is entered, it is necessary to save the configuration in EPROM (use write command) and restart the IDU for changes to take effect.
Mac	Show the MAC address of the Ethernet port.
Ver	Show software version of the IDU.
RestartCPU	Restart CPU of the management controller (new IP settings will take effect). Resets all management counters.

Switch specific commands	
Command	Description
Link oidnum {mux16 mux8 mux4 mux2}	Change OID number, enter <i>mux2</i> for IDUs with two E1 ports, <i>mux4</i> for IDUs with four E1 ports, etc.
Link remote IP <IPaddress>	Specify the IP address of the far-end SWB IDU management module Ethernet port (remote SWB IDU).
Link remote community <communityname>	Specify the read community name of the far-end SWB IDU.
Link remote write community <communityname>	Specify the write community name of the far-end SWB IDU.
Link1 community <communityname>	Specify the read community name of the local IDU, - the read community name set for the local IDU of link 1.
Link1 write community <communityname>	Specify the write community name of the local IDU, - the write community name set for the local IDU of link 1.
Link2 community <communityname>	Specify the read community name of the local IDU, - the read community name set for the local IDU of link 2.
Link2 write community <communityname>	Specify the write community name of the local IDU, - the write community name set for the local IDU of link 2.
Link1 IP <IPaddress>	Sets the IP address of the E1 IDU Ethernet management port for link 1.
Link2 IP <IPaddress>	Sets the IP address of the E1 IDU Ethernet management port for link 2.
Link1 stat	Returns the Rx signal level and alarm status information from the local site 1 (IDU 1 and ODU 1), e.g.: Link 1 Status : On Rx Level : -59 dBm Rf Alarm : Off Sync Lost Alarm: Off
Link2 stat	Similarly the Link1 stat .
Link1 remotestat	Returns the Rx signal level and alarm status information from the remote site 1.
Link2 remotestat	Returns the Rx signal level and alarm status information from the remote site 1.
Switch mode {dependent independent dependentfast}	Default switch operation mode is <i>far-end independent fast</i> , for more information refer to Chapter 2.3.
Switch active {1 2}	Change currently active link, same as "Active link" parameter from Setup mode of IDU LCD
Switch preflink {1 2}	Set the link that will be active after equipment reboot.
Switch force {1 2 Off}	Force the link (1 or 2) to be active ignoring any condition(s) that could cause to switch over to other link, "Off" – normal mode.
Switch delay <time>	Sets the time between switch-over attempts in seconds (the minimum delay is 1 second)
Switch order {sl ra rl sl rl ra ra sl rl ra rl sl rl sl ra rl ra sl sl ra -- sl rl -- ra sl -- ra rl -- rl sl -- rl ra -- sl -- -- ra -- -- rl -- --}	Same as "Switch order" parameter from Setup mode of IDU LCD, please refer to Chapter 3.1.2.

Switch rfmin <minRXlevel>	Same as "RF level min" parameter from Setup mode of IDU LCD, please refer to Chapter 3.1.2.
Switch rfmax <maxRXlevel>	Same as "RF level max" parameter from Setup mode of IDU LCD, please refer to Chapter 3.1.2.
Switch rfdelta <Difference>	Same as "RF level delta" parameter from Setup mode of IDU LCD, please refer to Chapter 3.1.2.
set localget <argument T>	Specifies the data request timeout interval for requests for information from local E1 IDUs; the interval will be equal to T/20 seconds where T is a given argument.
set localset <argument T>	Specifies the timeout interval for requests to configure local E1 IDUs; the interval will be equal to T/20 seconds where T is a given argument.
set remote <argument T>	Specifies the timeout interval for requests to remote SWB IDU; the interval will be equal to T/20 seconds where T is a given argument.
set chcycle <argument T>	Specifies a period which determines how frequently the waiting process will check if the answer is received for the current request. The period will be equal to T/20 seconds where T is a given argument.
set activeunreachable <attempts>	Specify how many times the SWB IDU will retry to communicate with active E1 IDU (via management port), in case if it does not respond. Smaller value gives faster switchover time in case of E1 IDU failure; in some special cases the false switchovers may occur, then this value should be increased. The minimum value is 1.

Security commands	
Command	Description
Enable password <password>	Specify a password to prevent unauthorized access to the ASCII PC terminal (connected through RS232 serial port). Refer to section <i>Security commands</i> , page 22.
Panel access <accesscode>	Specify a password to prevent unauthorized configuration through the IDU management interface. The password can be a number from 0 - 200.
WWWuser <username> <password>	Specify a password (1 - 20 symbols) to prevent unauthorized access to the Web terminal.
Telnetuser <username> <password>	Specify a password (1 - 20 symbols) to prevent unauthorized access to the Telnet terminal.

Management network configuration commands	
Command	Description
IP addr <IPaddress>	Set the IP address of Ethernet management port (requires to restart the management module CPU).
IP mask <IPnetmask>	Set the IP netmask of Ethernet management port (this requires to restart the management module CPU for changes to take effect).
IP gw <IPaddress>	Set the IP address of the default gateway connected to the Ethernet management port (this requires to restart the management module CPU for changes to take effect).
Route add <destinationIPaddr> Mask [netmask] <gateway> [metric]	Add a static route to the routing table for packets destined to the network(s) which are not to be accessed via radiolink. The variable "metric" is set to 1 by default. Example: Route add 192.168.205.0 Mask 255.255.255.0 155.13.79.13 5
Route delete <destinationIPaddr> [netmask]	Delete a static route from the routing table.
Remotenet add <destinationIPaddr> Mask [netmask]	Specify destination IP addresses (subnet address) of the routes for those packet(s) which will be sent via radiolink through the gateways <i>link1 IP</i> or <i>link2 IP</i> (primarily these addresses must be under the subnet of the far-end SWB and far-end E1 IDUs). Example: Remotenet add 192.168.205.0 255.255.255.0 (all packets destined to the specified subnet will be sent over the link through the current active gateway, - either through the gateway with the address <i>link1 IP</i> or gateway <i>link2 IP</i>). A maximum 32 subnet addresses can be specified.
Remotenet delete <destinationIPaddr> [netmask]	Delete the subnet address from the routing table for the IP traffic which is sent via radiolink.
SNMP community read <communityname>	Specify the SNMP community name of the agent to enable parameters to be read (not configured). The default community name to read parameters is <i>saf-public</i> .
SNMP community write <communityname>	Specify the community name of the agent to enable parameters to be written (configured). The default community name for writing parameters is <i>saf-private</i> .
SNMP trap <IPaddress>	Set the IP address of the management terminal with the installed Trap Manager software, based on SNMP platform (requires to restart the management module CPU).

Commands for script editing and storing	
Command	Description
Cfg show	Show the configuration script stored in RAM.
Cfg load	Load the configuration script from EPROM into RAM.
Cfg clear	Clear the script stored in RAM.
Cfg delete <stringNumber>	Clear a single string in the configuration script. This command is useful for script editing.
Cfg write	Save current script in EPROM. This command saves the current script and settings that are specified in it in EPROM. This command is equal to "write" command.
Syntax notes:	
<ul style="list-style-type: none"> - Commands are in bold font. - All arguments (variables) are in <i>italic</i> font. - Subcommands and keywords are in regular font. - Arguments in square brackets ([]) are optional but required arguments are in angle brackets (<>). - Alternative keywords are grouped in braces ({ }) and separated by vertical bars (). 	

3.3.2 Description of commands

General

The management module has RAM and EPROM memory onboard. When IDU is booted up or management module CPU is restarted, bootstrap is read and executed and loaded from the EPROM into RAM where it is effectively used. The bootstrap contains all commands and parameters that were previously stored in EPROM using **write** and/or **cfg write** commands. The bootstrap is stored in EPROM in the form of script and when booting up, the script commands are read, executed and parameters are loaded into RAM. These parameters can be changed in real-time (changing the contents of RAM) during the operation of management module. If the IDU is shut down without saving the current configuration in EPROM, the previous configuration will be restored from EPROM on the next boot-up.

Here is an example of script:

```
01: switch active 2
02: switch delay 10
03: link1 community IDU1-public
04: link1 community IDU2-public
05: link remote ip 192.168.206.12
06: link remote community SWB-1-1
07: link1 ip 192.168.205.10
08: link2 ip 192.168.205.11
```

The script can be edited using commands for script editing: strings can be added by simply entering the required command (or the instant string entry can be changed) and deleted using "**cfg delete** <string#>" command line. The changes of parameters can be saved in EPROM using **cfg write** command line.

To end Telnet/ASCII session, press Ctrl+D.

The management software includes system up-time and down-timer. The downtime counter counts the seconds when the *Synch Lost* alarm is on whereas the up-time counter returns the system up-time (in seconds). These counters are resetted using **clear counters** command from Telnet/ASCII terminal or from IDU, - selecting "Reset Counters" in Setup mode.

The management module has a watchdog timer (WDT) built in which manages the automatic restart of the management system if it freezes. Besides the **restartCPU** command the management system can be resetted using **restartWDT** command which breaks off check words to WDT thus causing the management system to restart. The watchdog timer can be turned off using **disableWDT** command (from Telnet/ASCII terminal) and can be turned on only by restarting the system using hidden reset button or unplugging power (refer to *Reset Functions*, page 13).

IDU name

The IDU name permanently appears in the prompt string of the Telnet/ASCII terminal software, it can also be seen on the IDU LCD by pressing "**clear**" button while in *status* display mode as well as on the Web browser window.

The name of the IDU can only be assigned using Telnet or ASCII terminal, this cannot be done using IDU management interface.

The IDU name is assigned with the following command "**name** <deviceName>".

The name can be a maximum of 16 symbols long. If using space(s), the argument should be in double quotes (e.g. **name** "SAFterm2 14 7").

Security commands

For Telnet, ASCII and Web terminals only one user is supported. The default username and password for Telnet terminal is:

- Username: telnet
- Password: saf

The default username and password for Web terminal is:

- Username: SAF
- Password: test

Take note of upper case and lower case type, it should be taken into account for both username and password!

The passwords may contain spaces, if using space(s) the password should be entered in quote marks.

For ASCII, Telnet and Web terminals the password can be changed simply re-entering the appropriate security command while logged on. To log off press Ctrl+D, the logging off is possible only if the password is specified. To disable password enter the password command appropriate for the specific terminal type followed by empty string, e.g., *enable password ""*.

Important!

The specification of password (or username and password) should always be followed by saving the configuration script (using "write" or "cfg write" commands) otherwise the password request will be ignored after the restart of management CPU.

The panel access code for access from IDU panel can be specified from the Telnet/ASCII terminal only. When the access code is enabled from the Telnet/ASCII terminal, the adjustment and configuration of any IDU/ODU parameters and loopbacks from IDU LCD is not available unless the correct access code is entered at the IDU. The specification of access code should also be followed by saving the configuration script otherwise the access code will be disabled on the IDU restart. The panel access code can be changed simply entering the new access code (number from 0 - 200) using *panel access* command from Telnet/ASCII terminal. To disable the panel access code it must be changed to 0 (zero) value.

There is no default password set for ASCII terminal (a terminal connected to RS232 management port) nor the access code from IDU panel is specified, - it is set to 0. Currently there are no possibilities to bypass password of any type of terminal, for instance if the user has forgotten it. The boot recovery functionality for such cases will be available in the upcoming software versions.

Real-time clock

The real-time clock does not provide any extra functionality at the moment, however in the upcoming management software versions it will be used for building of event logs.

The clock is not available on the IDU LCD, the date and time can be viewed using **Time** command when using ASCII or Telnet console.

Date and time parameters can be set using "**Time** <YYYY-MMM-DDD HH:mm:ss>" command line.

Switch commands

The SWB IDU permanently sends various requests to the local E1 IDUs and the remote SWB IDU. Requests can be classified in two types – requests to return information and requests to perform a configuration. In both cases the IDU that received the request responds by sending the appropriate answer to the SWB IDU regardless of whether the request has been accomplished successfully (e.g. frequency channel changed) or not (e.g. due to wrong argument).

When the request is sent, the next request will not be sent until the answer to the previous request is received. Once the instant request is sent, the timeout counter for the answer of that request is started and waiting process is initiated during which new requests will not be sent, this routine also periodically checks if the answer to that request is not received from the destination device with a period specified by *chcycle* parameter. The waiting process will terminate (allowing next request to be sent) if

- the answer is received from the destination device and the timeout interval specified with *localget*, *localset* or *remote* parameter has not expired,
- the answer has not been received from the destination device and the timeout interval specified with *localget*, *localset* or *remote* parameter has expired.

In this manner the *localget*, *localset* and *remote* commands are linked with the *chcycle* command, and these commands specify time after which the waiting process should be terminated if the answer has not been received; the *localget* command specifies the timeout interval for the requests to return information either from the local E1 IDU 1 or local E1 IDU 2. The *localset* command specifies the timeout interval for the requests to perform a configuration either for the local E1 IDU 1 or local E1 IDU 2. The *remote* command specifies the timeout interval for any type of requests to the remote SWB IDU.

All of these four parameters are given with argument T where the actual time interval equals T/20 seconds (e.g., if T=20 then interval is 1 second).

3.4 Ethernet Management Port

The Ethernet management port of the IDU terminal is intended as main source of management connectivity and will provide the broadest range of management functionality:

- Web management via integrated Web server of management board;
- SNMP management via integrated SNMP agent of management board;
- Telnet server and CLI interface.

Ethernet interface could be used:

- To connect IDU to PC/Laptop to manage IDU;
- To LAN to constantly monitor IDU;
- To router or any other TCP/IP packet network termination unit to have IDU as part of network for management information.

3.4.1 SNMP Interface

In order to receive SNMP traps from the SWB IDU management controller, the IP address of the management PC with the installed Trap Manager software (based on SNMP platform) should be specified from a Telnet or ASCII console.

The IP address of the SNMP Trap Manager can be specified using the "SNMP trap <IPaddress>" command.

The default value is **255.255.255.255** (no SNMP Trap Manager specified).

The Trap Manager address should be configured for each IDU, from which it is necessary to receive information on parameters, counters and alarms. The information is sent as SNMP Trap packets through the mediation of UDP protocol. If the Trap Manager terminal cannot be accessed, - for example, if it is not connected to the Ethernet management port or IP settings of the management port are improper, a longer delay (about 10 sec.) may appear on the IDU startup. SNMP management functionality is available from any SNMP browser, by means of compiling provided MIB file to the MIB browser application's MIB module.

SAF MIB is available from:

- SAF Tehnika Web site: www.saftehnika.com,
- From SAF Tehnika tech support, email: techsupport@saftehnika.com,
- Contacting SAF Tehnika or distributors.

```
**** SNMP QUERY STARTED ****
1: activeLink.0 (integer) link2(2)
2: localLink1Status.0 (integer) linkoff(3)
3: localLink2Status.0 (integer) on(4)
4: remoteLink1Status.0 (integer) unreachable(1)
5: remoteLink2Status.0 (integer) unreachable(1)
6: remoteControlStatus.0 (integer) unknown(0)
7: localLink1RxLevel.0 (integer) -65
8: localLink2RxLevel.0 (integer) -70
9: remoteLink1RxLevel.0 (integer) 0
10: remoteLink2RxLevel.0 (integer) 0
11: localLink1rfAlarm.0 (integer) 0
12: localLink2rfAlarm.0 (integer) 1
13: remoteLink1rfAlarm.0 (integer) 1
14: remoteLink2rfAlarm.0 (integer) 1
15: localLink1SyncLostAlarm.0 (integer) 0
16: localLink2SyncLostAlarm.0 (integer) 0
17: remoteLink1SyncLostAlarm.0 (integer) 1
18: remoteLink2SyncLostAlarm.0 (integer) 1
**** SNMP QUERY FINISHED ****
```

Sample of SNMP query of the CFM-34-SWB IDU

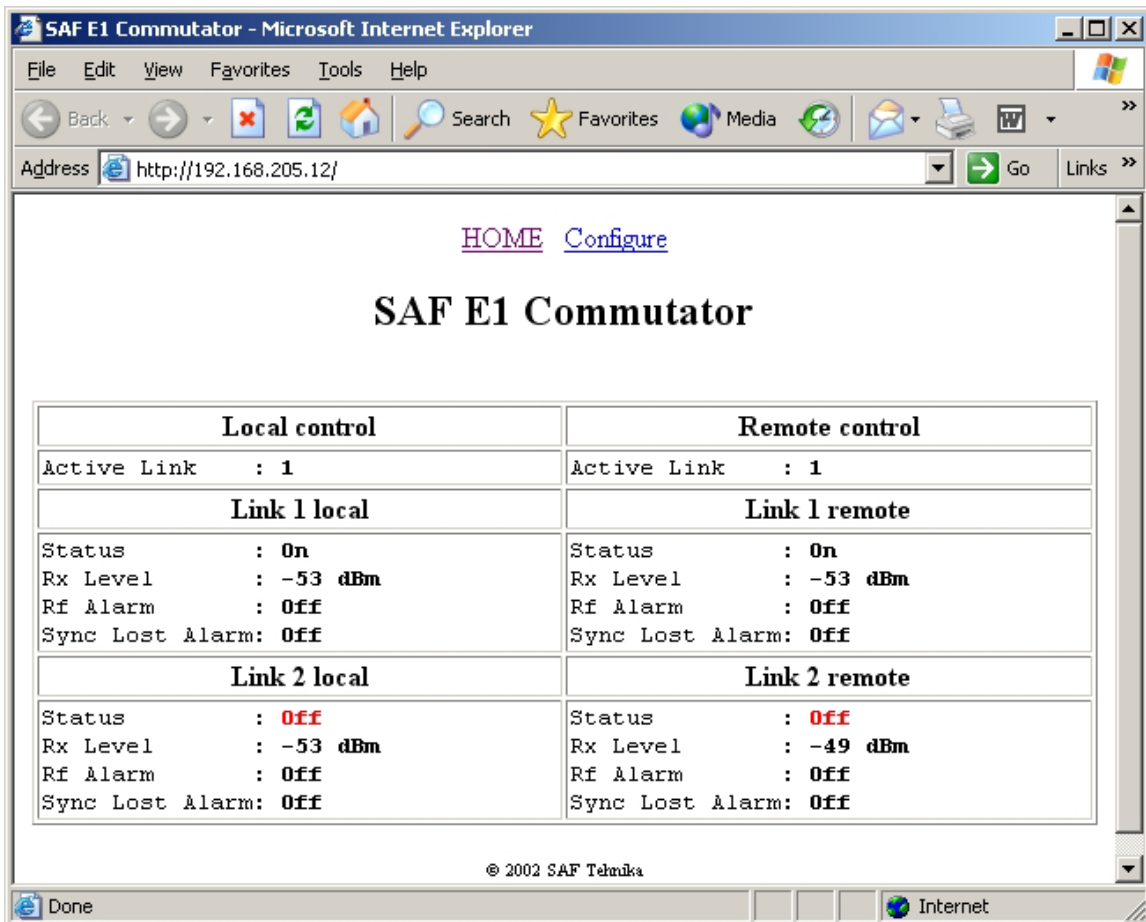
The following table describes all variables defined in the MIB.

Variable Name	Variable Type	Value List	Description
termProduct	String		Textual name of terminal type
termDescription	String		Textual description of terminal
termLocation	String		IDU name
termVersion	String		Textual version of management software
termOperation	Integer (32 bit)	none(0) booting(1) ok(2) testing(3) error(4)	Terminal (IDU) operational status: <i>none</i> – not initialized; <i>testing, illegalSpeed, error</i> – reserved
termIduTemperature	Integer (32 bit)		Temperature within IDU (range: -128..127)
activeLink	Integer (32 bit)	unknown(0) link1(1) link2(2)	Shows from which link (from E1 IDU 1 or IDU 2) the traffic is currently being received at the local site.
localLink1Status	Integer (32 bit)	unknown(0) unreachable(1) oiderror(2) linkoff(3) on(4)	Shows the status of the local site 1 (IDU 1 and ODU 1): <i>oiderror</i> – wrong OID number is specified <i>unreachable</i> – site 1 is not reachable (e.g., site 1 is powered off) <i>unknown</i> – site 1 can not be reached due to other types of problems <i>linkoff</i> – traffic signal is not being received from link 1 <i>on</i> – traffic is being received from link 1
localLink2Status	Integer (32 bit)	Analogically to <i>localLink1Status</i> parameter	
remoteLink1Status	Integer (32 bit)	unknown(0) unreachable(1) oiderror(2) linkoff(3) on(4)	The same as with <i>localLink1Status</i> parameter but for the remote site 1
remoteLink2Status	Integer (32 bit)	Analogically to <i>remoteLink1Status</i> parameter	
remoteControlStatus	Integer (32 bit)	unknown(0) unreachable(1) oiderror(2) ok(4)	Shows the status of the remote SWB IDU, normally <i>ok</i> .
localLink1RxLevel	Integer (32 bit)		Received signal level [dBm] in the local site 1
localLink2RxLevel	Integer (32 bit)		Received signal level [dBm] in the local site 2
remoteLink1RxLevel	Integer (32 bit)		Received signal level [dBm] in the remote site 1
remoteLink2RxLevel	Integer (32 bit)		Received signal level [dBm] in the remote site 2
localLink1rfAlarm	Integer (32 bit)	off(0) on(1)	Shows if the radio alarm is switched on for the local site 1
localLink2rfAlarm	Integer (32 bit)	off(0) on(1)	Shows if the radio alarm is switched on for the local site 2
remoteLink1rfAlarm	Integer (32 bit)	off(0) on(1)	Shows if the radio alarm is switched on for the far-end site 1
remoteLink2rfAlarm	Integer (32 bit)	off(0) on(1)	Shows if the radio alarm is switched on for the far-end site 2
localLink1SyncLostAlarm	Integer (32 bit)	off(0) on(1)	Shows if the sync lost alarm is switched on for the local site 1
localLink2SyncLostAlarm	Integer (32 bit)	off(0) on(1)	Shows if the sync lost alarm is switched on for the local site 2
remoteLink1SyncLostAlarm	Integer (32 bit)	off(0) on(1)	Shows if the sync lost alarm is switched on for the far-end site 1
remoteLink2SyncLostAlarm	Integer (32 bit)	off(0) on(1)	Shows if the sync lost alarm is switched on for the far-end site 2
remoteActiveLink	Integer (32 bit)	unknown(0) link1(1) link2(2)	Shows from which link (from E1 IDU 1 or IDU 2) the traffic is currently being received at the far-end site.
remoteNotify	Integer (32 bit)	-	This parameter is write-only and it is not user configurable.

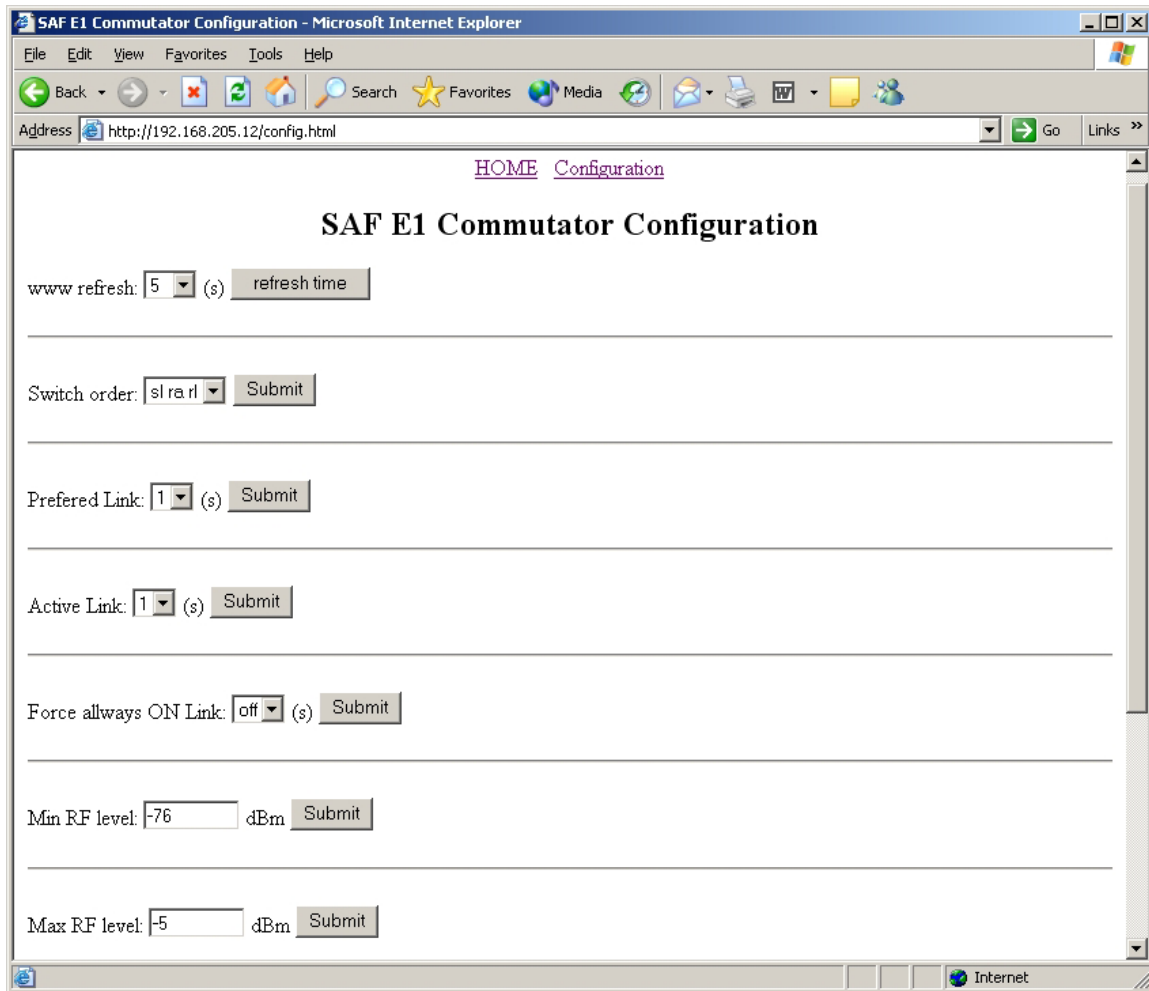
3.4.2 Web Interface

The implementation of Web interface for the SWB IDU provides monitoring and configuration capabilities similar to ones available from the IDU LCD, front panel LEDs, and from the Telnet/ASCII console, please refer to description of status parameters described in section "Status Display" Mode of the LCD, page 10 and front panel LEDs in Table 2, page 5.

The Web-page interface is available via the Ethernet management port only.



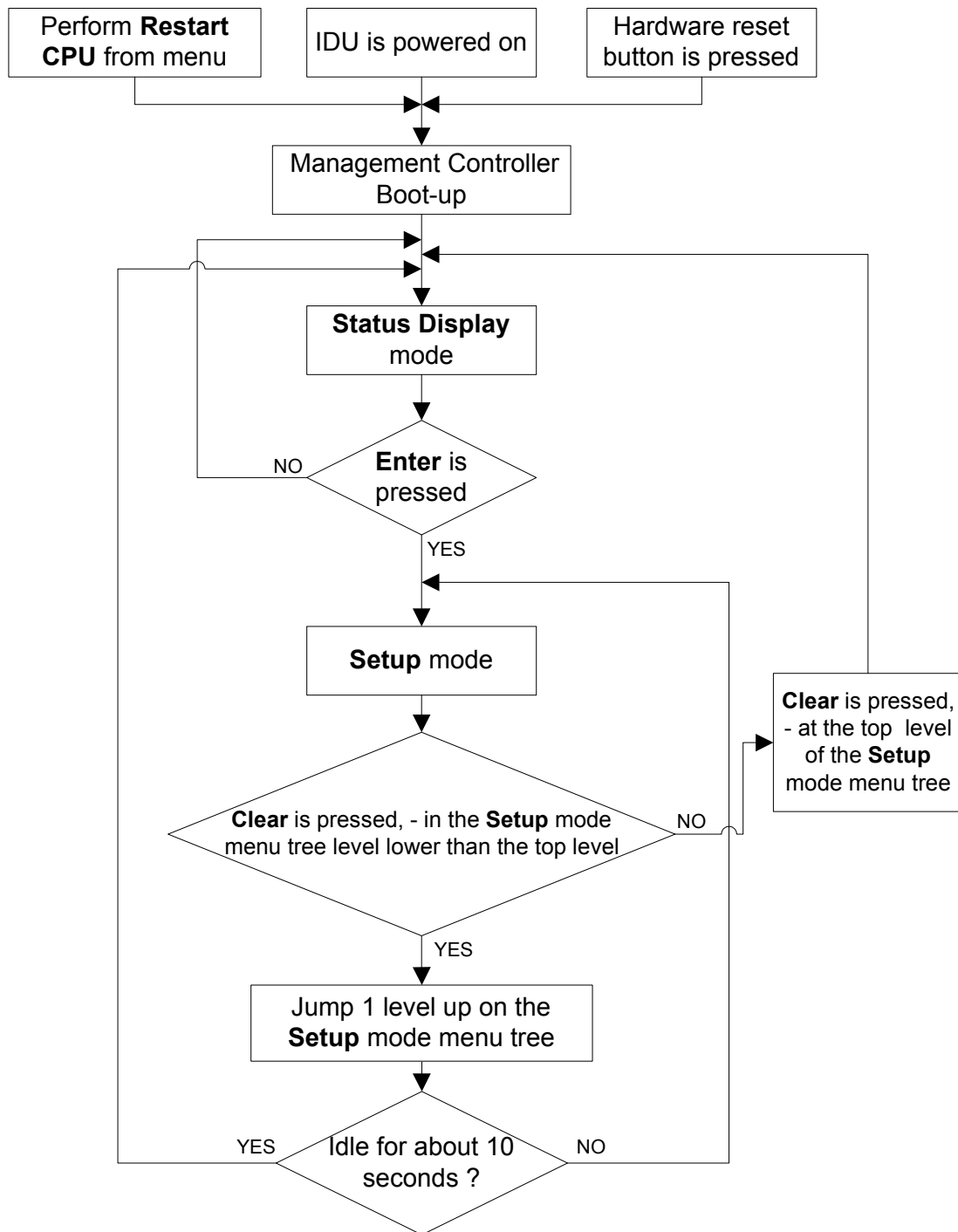
The CFM-34-SWB IDU main management window: it displays the received signal level and alarm status of each site in both links.



The CFM-34-SWB IDU Configuration window

In order to modify SWB IDU settings, save the configuration, restart the CPU, or change the Web page refresh time, go to the Configuration Window by clicking on *Configure* link in the main window. When clicked on the *Configure* link for the first time, you will be prompted to enter User Name and Password. The default username is **SAF**, default password is **test**.

3.5 Algorithm of LCD Operation



Flow Chart 1. Using LCD

3.6 Updating Management Software

Updates to management software for management controller board will be available as uploadable files from SAF Tehnika company, sales partners or Web site.

Upload functionality is provided through management controller software monitor function and is available via RS-232 serial port.

Upload could be performed from PC/Laptop connected to serial port of IDU from any PC terminal program with text file loading functionality.

The instructions on performing the software upload are provided with the upgrade files. There is also a special management software upgrade guide available from SAF Tehnika, see References.

3.7 Default Settings

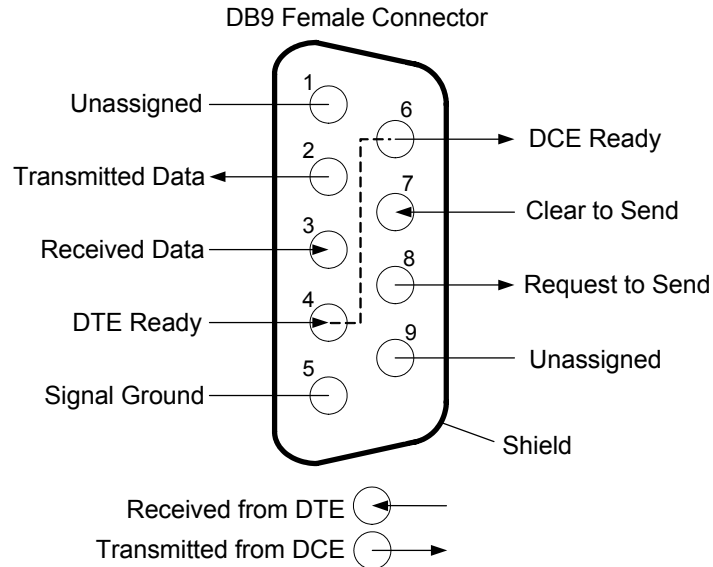
Parameter/description	Parameter name or command line		Default value/setting
	Telnet / ASCII	LCD	
Rx signal level by which the Radio Alarm is turned on	RxAlarmLevel	RxAlarmLev	-77 dBm
Management controller IP address	IP addr	IP	192.168.205.10 or 192.168.206.10
Management controller IP address netmask	IP mask	Netmask	255.255.255.0
IP address of the gateway to the service channel	IP gw	Gateway	255.255.255.255
Transmitter power	txpower	Tx Power	0 dBm
<i>Default switch operation mode</i>	Switch mode	-	Dependentfast

IDU name	Name	-	SAF
SNMP community name of the agent to read (all SNMP parameters are read-only)	SNMP community read	-	Saf-public
IP address of the SNMP trap manager	SNMP trap	-	255.255.255.255 - trap manager not specified
Web page refresh time	Webrefresh	-	5 seconds
Username and password for ASCII console	Enable password	-	(disabled)
Access number for LCD/Keypad	Panel access	-	0 (disabled)
Username and password for Web terminal	WWWuser	-	Username: SAF Password: test
Username and password for Telnet terminal	Telnetuser	-	Username: telnet Password: saf
IP address of the far-end SWB IDU management module Ethernet port	Link remote IP	Remote IP	192.168.205.15
Community name of the far-end SWB IDU	Link remote community	-	Saf-public
Community name of the local IDU of link 1	Link1 community	-	Saf-public
Community name of the local IDU of link 2	Link2 community	-	Saf-public
IP address of the E1 IDU Ethernet management port of link 1	Link1 IP	Link 1 IP	192.168.205.15
IP address of the E1 IDU Ethernet management port of link 2	Link2 IP	Link 2 IP	192.168.205.15
Active link	Switch active	Active link	1
OID number	Link oidnum	OID number	10 (for 8xE1 MUX)
Polling order	Switch order	Switch order	{sl, ra, rl}
RF level delta	Switch rfdelta	RF level delta	15 dB
Maximum RX signal level	Switch rfmax	RF level max	-5 dBm
Minimum RX signal level	Switch rfmin	RF level min	-76 dBm
Switch delay (time between two switch-over attempts)	Switch delay	Switch delay	5 seconds
Forced link	Switch force	Force ON Link	none
Preferred Link	Switch prelink	Preferred Link	1

4 Pinouts

- Standard Ethernet patch cables should be used for Ethernet management port;
- Any "straight through" or modem serial cable can be used with RS-232 Telnet/ASCII management port.

RS-232 management port pinouts



Ethernet and E1 port pinouts

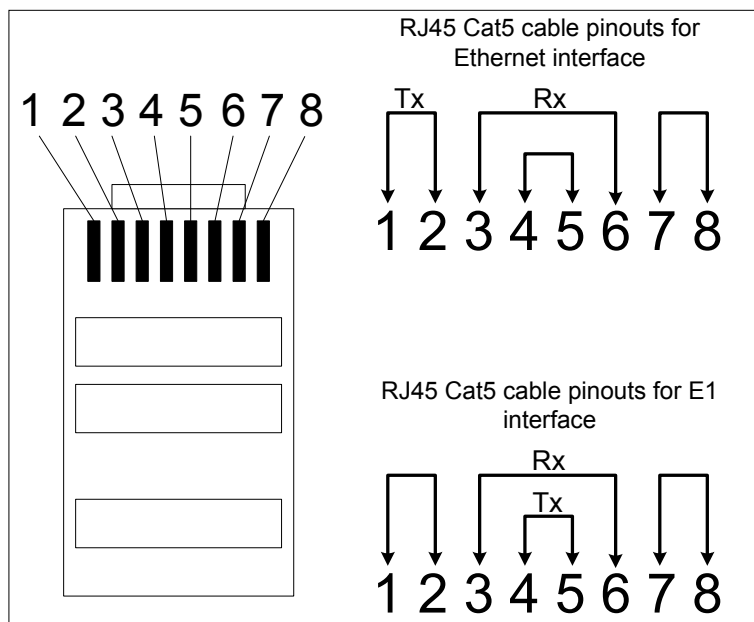


Figure 9. E1 and Ethernet traffic interface pinouts

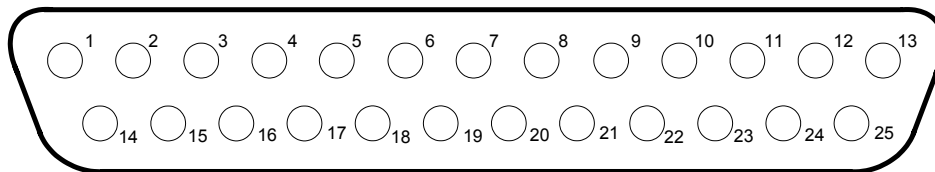
DB25 E1 traffic port pinouts

See pin numbers in the picture below.

14, 15	INPUT CH1
3, 4	OUTPUT CH1
17, 18	INPUT CH2
6, 7	OUTPUT CH2
20, 21	INPUT CH3
9, 10	OUTPUT CH3
23, 24	INPUT CH4
12, 13	OUTPUT CH4

All other pins are GND.

Male DB25



5 Installation and Setup

5.1 Installation Summary

The installation involves the following procedures:

1. Equipment Physical Installation

- Establish two links (one IDU and one ODU on each end per link);
- On both sides connect both E1 IDUs and SWB IDU to the common network referred to as SNMP management network. All IDUs on one side (two E1 and SWB) must be connected to one common management network; the same for the other side.

2. Configuration of IP addresses

- Set IP addresses for IDU Ethernet management and virtual Serial Ports;
- Set IP addresses for SWB IDU.

3. Routing Configuration via Management Console

- Run Telnet and connect to the E1 IDU Telnet server (both E1 IDUs on each side);
- Add the route.

4. SNMP configuration

- Verify community names of the SWB IDUs, change community name(s) if necessary;
- Verify community names of the E1 IDUs, change community name(s) if necessary.

5.2 Procedure 1: Physical Installation

Establishing links

First of all two microwave links must be established. Altitude and disposition of antennas depends on line-of-sight and profile analysis, type of diversity to be used, and other factors. These issues are not inspected in this manual.

Connecting IDUs to the SNMP management network

As mentioned above near-end and far-end site consists of one SWB IDU, two E1 IDUs and two radios respectively. Near-end SWB IDU and both E1 IDUs should be interconnected via Ethernet management ports within a common network. This can be solved using built-in Fast Ethernet switch. The same should be done at the far-end site. The management console and IDUs (SWB and E1) should be connected within the common management network (see Figure 10 and Figure 11). Both management networks on each side can be interconnected via the service channel over the hop.

Note: If using the built-in Fast Ethernet switch as in Figure 10, any type of cat. 3 or cat. 5 patch cables (either cross-over or straight) can be used to interconnect IDU with the switch.

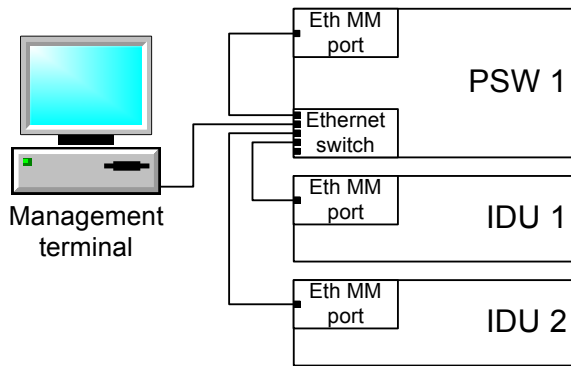


Figure 10. Connecting E1 IDUs and SWB IDU in the common management network using the built-in Fast Ethernet switch

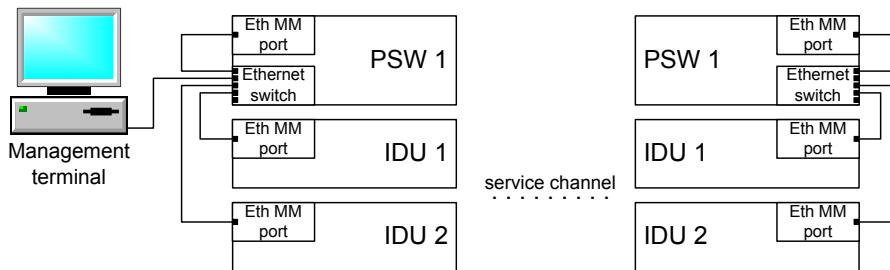


Figure 11. Common example of management network of protected link

5.3 Procedure 2: Configuring IP addresses

Each of the IDU in the management network requires a proper IP address. See an example of IP settings in Figure 12.

Configuring IP addresses for E1 IDUs

On LCD menu choose "Select: Service line"

- Set local IP
- Set remote IP

See example in Figure 12.

On LCD menu choose "Select: Ethernet"

- Set IP address
- Set Netmask
- Set Gateway

IP addresses should be set for all (six) IDUs. Refer to example in Figure 12.

Configuring IP addresses for SWB IDUs

On LCD menu choose "*Select: Ethernet*"

- Set IP address
- Set Netmask
- Set Gateway

Refer to example in Figure 12.

Note: the SWB IDU default gateway address should be the address of a Telnet console (or Web terminal).

On LCD menu choose "*Select: Link 1*"

- Set IDU 1 IP address

On LCD menu choose "*Select: Link 2*"

- Set IDU 2 IP address

On LCD menu choose "*Select: Remote*"

- Set remote SWB IDU IP address

Refer to example in Figure 12.

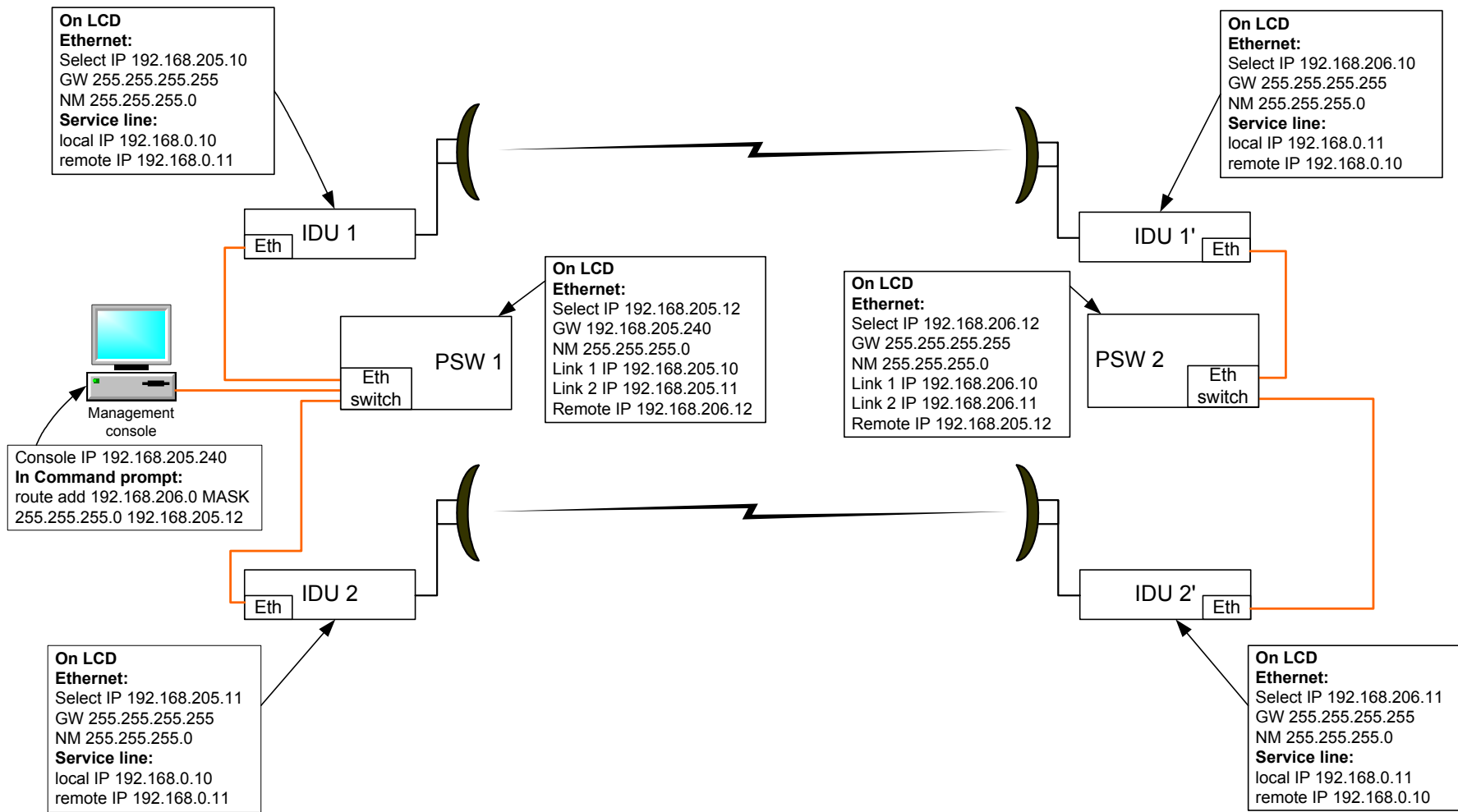


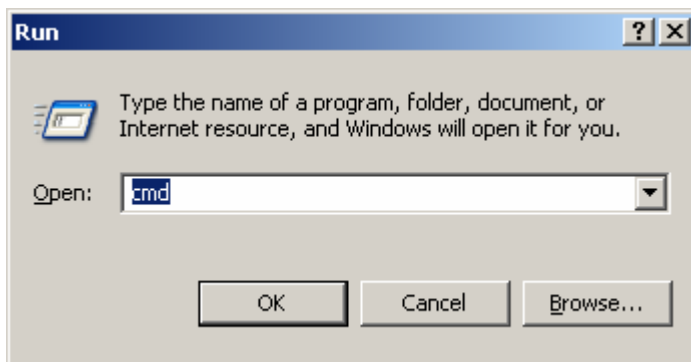
Figure 12. Example of the IP routing configuration for one 1+1 link

5.4 Procedure 3: Configuring Routing via Management Console

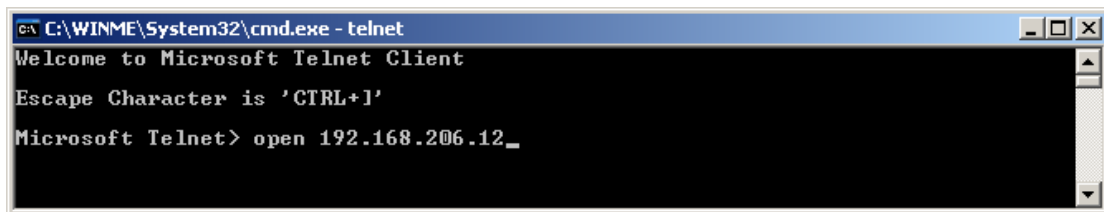
When IP addresses are set to all IDU, you should add route to Management console (PC that is connected to near-end HUB/Switch). It can be done in the way described below.

Note: the procedure described below is not necessary if the Management PC is running RIP (Routing Information Protocol) service.

- Run Telnet client program: If using Windows click on the Start button on Windows Taskbar and click *Run*, then in "open:" combo box type *cmd* and press Enter.



In Command Prompt window type *telnet* and press Enter.



- Add a route. Type the command as shown below:
route add 192.168.206.0 MASK 255.255.255.0 192.168.205.12
Refer to example in Figure 12.

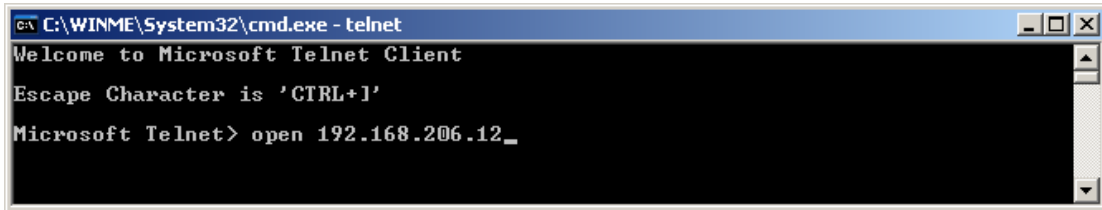
Note: this is only an example referred to the Figure 12.

5.5 Procedure 4: Configuring SNMP Parameters

The SWB IDU communicates with two local E1 IDUs and the far-end SWB IDU via SNMP. All IDUs should have identical community names. For both SWB IDUs and all E1 IDUs the default read community name is "saf-public".

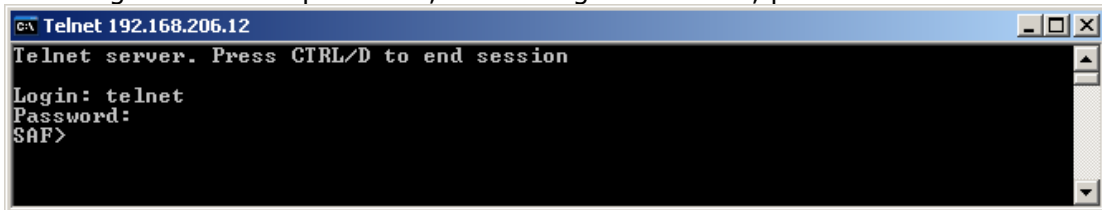
At first check far-end SWB IDU:

- Run Telnet client (as described above)
- Type "open <remote end SWB IDU Ethernet IP address>" and press Enter (see the following picture).



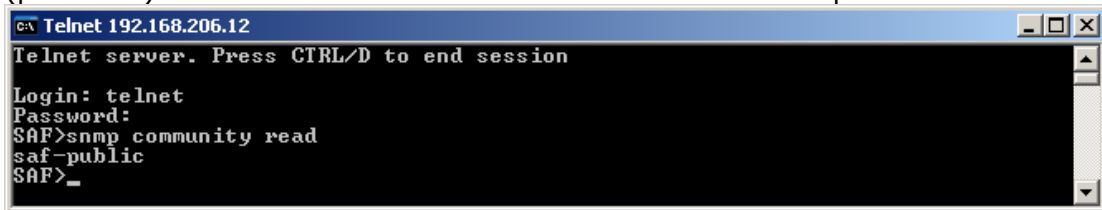
```
C:\WINME\System32\cmd.exe - telnet
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+I'
Microsoft Telnet> open 192.168.206.12_
```

Enter login name and password, default login is **telnet** , password **saf**



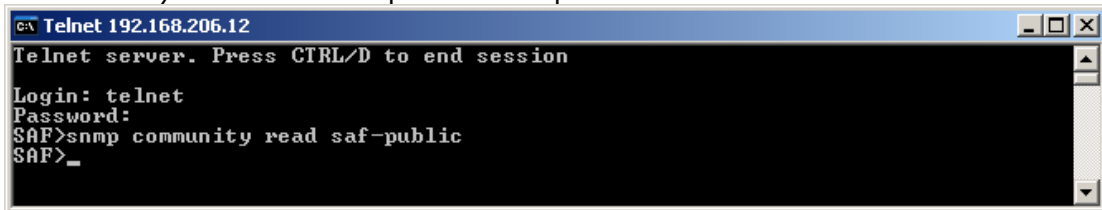
```
Telnet 192.168.206.12
Telnet server. Press CTRL/D to end session
Login: telnet
Password:
$AF>
```

Type "snmp community read" and press Enter, this will return current name (password) of the SWB IDU in the SNMP network to read the parameters.



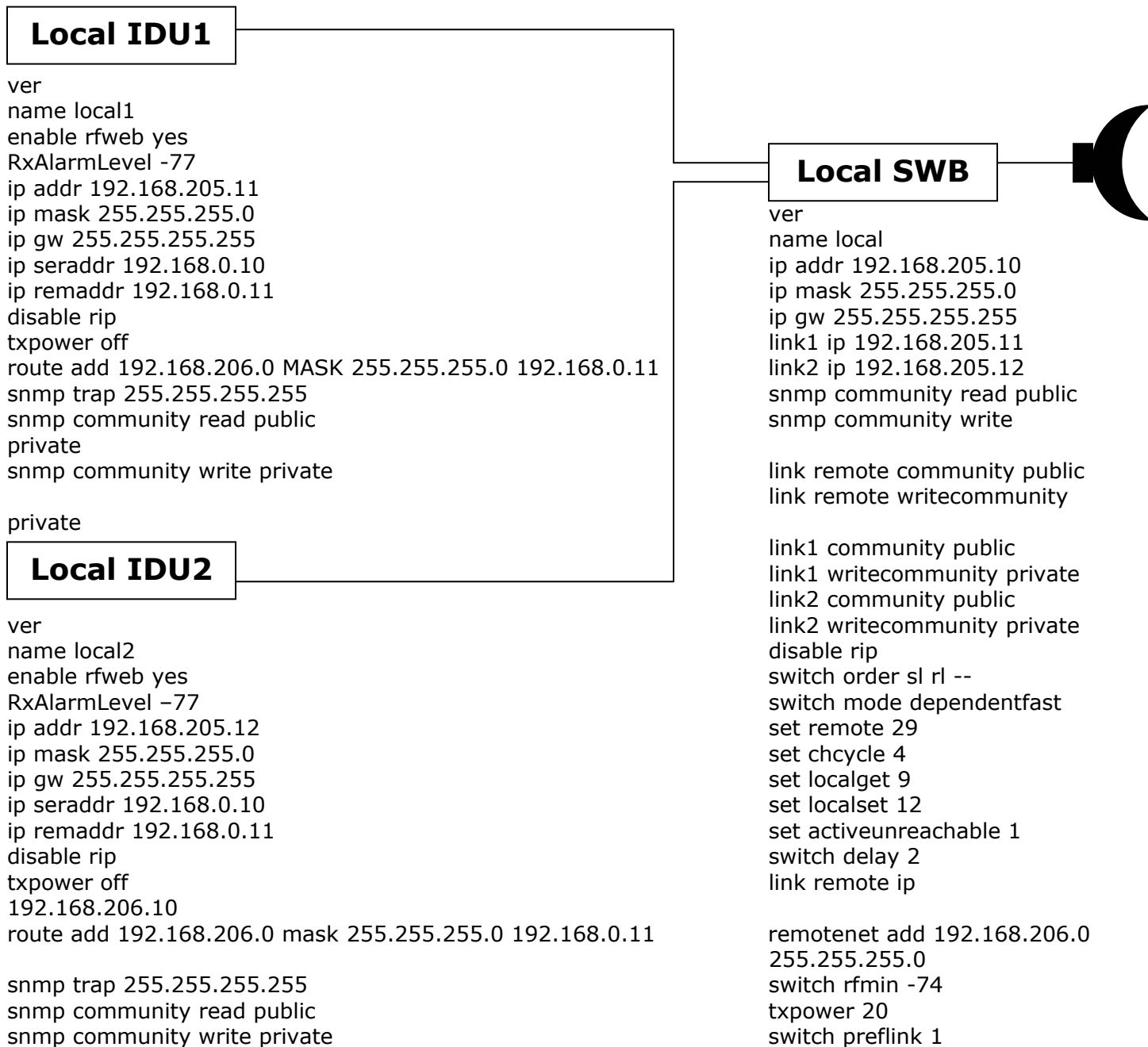
```
Telnet 192.168.206.12
Telnet server. Press CTRL/D to end session
Login: telnet
Password:
$AF>snmp community read
saf-public
$AF>
```

In order to change the SNMP community name type "SNMP community read <community name>". Example is in the picture below.



```
Telnet 192.168.206.12
Telnet server. Press CTRL/D to end session
Login: telnet
Password:
$AF>snmp community read saf-public
$AF>
```

5.6 Configuration script example





Remote SWB

```
ver
name remote
ip addr 192.168.206.10
ip mask 255.255.255.0
ip gw 255.255.255.255
link1 ip 192.168.206.11
link2 ip 192.168.206.12

snmp community read public
snmp community write private
link remote community public
link remote WriteCommunity private
link1 community public
link1 WriteCommunity private
link2 community public
link2 WriteCommunity private
disable rip
switch order sl rl --
switch mode dependentfast
set remote 29
set chcycle 4
set localget 9
set localset 12
set activeunreachable 1
switch delay 2
link remote ip 192.168.205.10
remotenet add 192.168.205.0 255.255.255.0

switch rfmin -74
txpower 20
switch preflink 1
```

Remote IDU1

```
ver
name remote1
enable rfweb yes
RxAlarmLevel -77
ip addr 192.168.206.11
ip mask 255.255.255.0
ip gw 255.255.255.255
ip seraddr 192.168.0.11
ip remaddr 192.168.0.10
disable rip
txpower off
route add 192.168.205.0 MASK
        255.255.255.0 192.168.0.10
snmp trap 255.255.255.255
snmp community read public
snmp community write private
```

Remote IDU2

```
ver
name remote2
enable rfweb yes
RxAlarmLevel -77
ip addr 192.168.206.12
ip mask 255.255.255.0
ip gw 255.255.255.255
ip seraddr 192.168.0.11
ip remaddr 192.168.0.10
disable rip
txpower off
route add 192.168.205.0 mask
        255.255.255.0 192.168.0.10
snmp trap 255.255.255.255
snmp community read public
snmp community write private
```

6 SAF Tehnika A/S Contacts

Most up to date contacts of SAF Tehnika A/S could be found at Web site www.saftehnika.com.

SAF Tehnika A/S technical support could be reached at:

- Email: techsupport@saftehnika.com
- Telephone: +371 7046840
- Fax: +371 7020009

7 References

All the documents comprised in this chapter can be ordered from SAF Tehnika or its sales representatives.

7.1 Technical Descriptions

There are two technical descriptions available:

- *SAF CFM LM Series Microwave Radio System Product Family: Technical Description*; This document is a generic technical description of the CFM-LM ODU and IDUs that are compatible with it, it comprises the installation and commissioning issues and respective accessories, functional descriptions, technical data, a.o.
- *SAF CFM L4 Series Microwave Radio System Product Family: Technical Description*; This document is a generic technical description of the CFM-L4 radio and IDUs that are compatible with it, it comprises the installation and commissioning issues and respective accessories, functional descriptions, technical data, a.o.

7.2 Configuration Guide

Configuration guides provide the necessary information regarding the configuration of SAF Tehnika's CFM products, these documents describe the management system, this is also partly covered in the CFM-LM/L4 Product Family Technical Description.

The following configuration guides are available:

- *CFM Series E1 Indoor Units: Management System Technical Description and Configuration Guide*

7.3 Management Software Update Guide

This guide provides the user of the CFM series equipment with the information required to update the management software.

- *SAF CFM Series Microwave Radio System Indoor Unit Management Software Update Guide*