voice INTER connect

User Manual

‘vicCOM IP’

Revision: 10

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History

Revision	Changes	Date	Author
01	First version	30/11/2020	Kinast
02	Release of software *vicCOM IP v2.0.1*	05/02/2021	Kinast
03	Release of software *vicCOM IP v2.1.0*	21/07/2021	Kinast
04	Release of software *vicCOM IP v2.2.0*	31/08/2021	Kinast
05	Release of software *vicCOM IP v2.3.0*, Adding the power supply modes for PoE connections	08/12/2021	Kinast
06	Release of software *vicCOM IP v2.4.0*	04/04/2022	Kinast
07	Release of software *vicCOM IP v2.4.1*	27/03/2023	Kinast
08	Release of software *vicCOM IP v2.5.0*	29/05/2024	Kinast
09	Release of software *vicCOM IP v2.5.1*	08/07/2024	Kinast
10	Release of software *vicCOM IP v3.0.0*, Adding the explanation of the input behaviour in section 5.11	13/02/2025	Kinast

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1 Key Features

- System kit for IP intercom units
- Native support of SIP protocol (with SIP server or serverless)
- Full-duplex audio communication with integrated echo cancellation (AEC), noise reduction (NR) and multimedia audio bandwith ($f_s = 16\,\text{kHz}$)
- Receiving announcements
- Connection of keypads of flexible sizes
- Sending and receiving of DTMF tones
- Direct connection for electret microphones
- 2 Loudspeaker connectors up to $10\,\text{W}$ each
- Direct connections for up to 5 LEDs
- Direct connections for up to 4 buttons
- 2 potential free relay outputs
- 2 potential free inputs
- Fully configurable via web interface
- Connectors Würth WR-TBL series 3221 or compatible
- Voltage supply via PoE+ (PD) or separate voltage connector
- Second Ethernet connector with PoE output (PSE)
- Energy-efficient design with min. power consumption of about $1\,\text{W}$
- Extended operating temperature range from -40 up to $+70\,°\text{C}$
- Saving and restoring the configuration
- Updatable software
- Expandable functionality through standardised interfaces e.g. USB, I2S, I2C, SPI

2 Changelog

[2025-02-13] vicCOM IP v3.0.0

- Extensive support for DTMF (see Section 5.14)
- Extensive support for keypads (see Section 5.12)
- Update of audio signal processing to the most recent version with new parameters
- Adding new configurations for inputs and outputs (see Section 5.11)
- Add a static emergency IP address (see Section 4.7)
- New version of configuration → 3
- Update of GUI libraries to the most recent version
- BUGFIX: Status information in the GUI now always up-to-date
- More precise GPIO handling
- Improved network stability for daisy-chain operation
- Display of the hardware revision in the GUI
- Update to Kernel 5.10.120

[2024-07-08] vicCOM IP v2.5.1

- BUGFIX: fix delay in automatic call answer
- BUGFIX: fix LED transitions between different flashing modes

[2024-05-29] vicCOM IP v2.5.0

- SIP Transport can be switched between UDP and TCP
- SIP Agent Name can be configured
- New version of configuration → 2
- Improvement of internal memory management

[2023-03-27] vicCOM IP v2.4.1

- BUGFIX: Correction of an audio problem occuring for early media streams

[2022-04-04] vicCOM IP v2.4.0

- Export and import of platform configuration
- Firmware update and configuration export/import available for admin role only
- BUGFIX: performance issue solved
- BUGFIX: checkboxes were not displayed correctly in GUI

[2021-12-08] vicCOM IP v2.3.0

- Receive up to 9 announcements (including volume setting)
- Global priorities for all calls and announcements
- Behaviour of outputs with time limit
- Adding a monostable output behaviour 'mono'
- Faults can be displayed alternatively during standby

[2021-08-31] vicCOM IP v2.2.0

- Support for *Session Traversal Utilities for NAT* (STUN)
- RTP ports can be adjusted
- BUGFIX: Web interface could show incorrect data

[2021-07-21] vicCOM IP v2.1.0

- Webinterface now available via standard http port (80)
- Hostname of platform can be set now
- Timezones can be set now by city names
- Adjustable self-test of the audio components
- Firmware update via web interface
- Reset to factory settings
- https connection for web interface
- Re-registering at SIP server can be set now
- Successful connection to SIP server will be displayed
- SIP Audio Codecs are adjustable now
- Number filter for incoming calls
- Settings of in- and outputs can be set now
- Introducing of SNMP traps

- Usage of on-Board LEDs for signalising states, see Section 4.3
- LTS kernel 5.10.9
- BUGFIX: Display name will be transmitted for SIP calls now

[2021-02-05] vicCOM IP v2.0.1

- Add english translation of web interface
- Various bugfixes

[2020-11-30] vicCOM IP v2.0.0

- First production-ready release

[2020-03-19] vicCOM IP v1.0.0

- First release for demonstrator

3 Hardware

3.1 Version

Description	Board version	Placement variant
vicBASE-5	1.3	1

3.2 Connection and Environmental Conditions

3.2.1 Absolute Maximum Ratings

Symbol	Name	Value	Unit
T_{STORE}	Storage temperature range	-65 bis 120	°C
T_{OP}	Operating temperature range	-40 bis 70	°C
FC	UL94 Flammability class	V-0	
V_{DD}	Operating voltage at X2	28	V
$P_{PoE,IN}$	Max. power PoE+ input at X3 (802.3at)	25.5	W
$P_{PoE,OUT}$	Max. power PoE output at X4 (802.3af)	15.4	W
$P_{LS,MAX}$	Max. output power each loudspeaker output	10	W
$P_{LS,CONT}$	Max. continous power each loudspeaker output (for min. $4\,\Omega$)	2.5	W
$U_{LS,max}$	Max. output voltage loudspeaker output	9	V(RMS)

3.2.2 Operating Conditions

Symbol	Name	Min	Norm	Max	Unit
$V_{DD,DC}$	Operating voltage at X2	9	12	24	V
I_{DD}	Current consumption at $12\,V$		70		mA
U_{MIC}	Voltage at microphone input MIC		30	100	mV(RMS)
$U_{LINE,IN}$	Voltage at LINE IN		1	1	V(RMS)
$U_{LINE,OUT}$	Voltage at LINE OUT		0.5	0.5	V(RMS)
R_L	Impedance of loudspeaker	4	4		Ω
$I_{LED,max}$	Current at LED output			20	mA
U_{LED}	Voltage at LED output		15	50	V
U_{IN}	Voltage at potential-free input	3		12	V
$U_{RELAY,max}$	Voltage at potential-free output			60	V
$I_{RELAY,max}$	Current at potential-free output			1	A

3.3 Connections

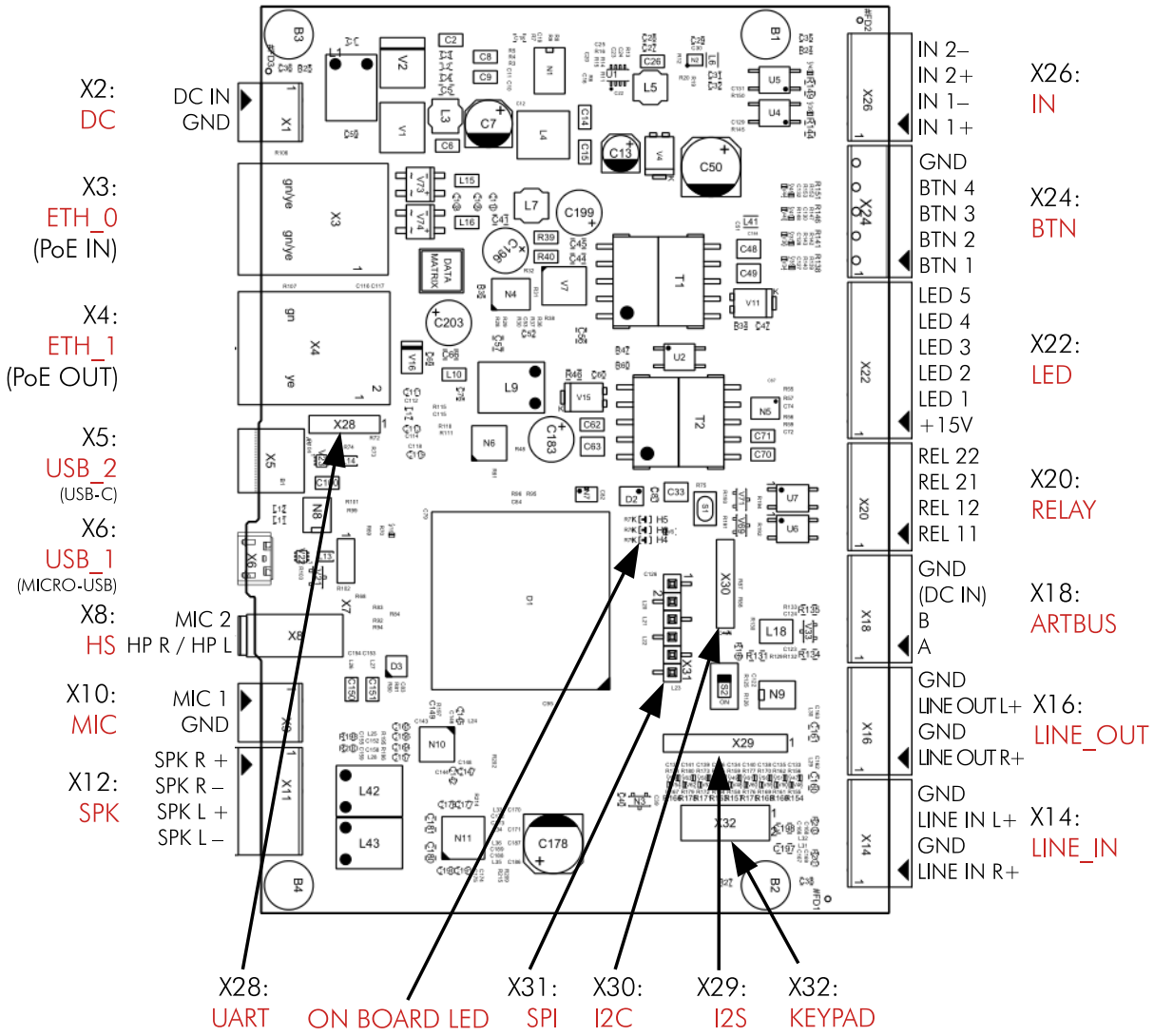

Figure 1: Connections of *vicCOM IP*

3.3.1 X2: DC

Pin	Type	Name	Description
1	Input	DC IN	Supply voltage (+)
2	Input	GND	Supply voltage GND

The DC input is protected against reverse polarity and overvoltage up to 42 V.

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.2 X3: ETH 0

Primary network connector with 10/100 MBit/s and PoE+ input (802.3at) for alternative voltage supply of *vicCOM IP*.

Supported power supply modes:

Pin	Type	Name	Description
1	Input	DC +	Supply voltage (+), *Mode A*
2	Input	DC +	Supply voltage (+), *Mode A*
3	Input	DC –	Supply voltage (–), *Mode A*
4	Input	DC +	Supply voltage (+), *Mode B*
5	Input	DC +	Supply voltage (+), *Mode B*
6	Input	DC –	Supply voltage (–), *Mode A*
7	Input	DC –	Supply voltage (–), *Mode B*
8	Input	DC –	Supply voltage (–), *Mode B*

Connector: RJ45

3.3.3 X4: ETH 1

Secondary network connector with 10/100 MBit/s and PoE output (802.3af, class 0) for voltage supply of external electrical components, e.g. webcams.

Supported power supply modes:

Pin	Type	Name	Description
1	Input	DC +	Supply voltage (+), *Mode A*
2	Input	DC +	Supply voltage (+), *Mode A*
3	Input	DC –	Supply voltage (–), *Mode A*
4	Input	DC +	Supply voltage (+), *Mode B*
5	Input	DC +	Supply voltage (+), *Mode B*
6	Input	DC –	Supply voltage (–), *Mode A*
7	Input	DC –	Supply voltage (–), *Mode B*
8	Input	DC –	Supply voltage (–), *Mode B*

Connector: RJ45

3.3.4 X5: USB 2

USB connector for future development of *vicCOM IP*.

Connector: USB-C

Not supported at the moment.

3.3.5 X6: USB 1

USB connector for future development of *vicCOM IP*.

Connector: Micro-USB

Not supported at the moment.

3.3.6 X8: HS

Pin	Type	Name	Description
Tip	Output	L	Headphone left channel
Ring	Output	R	Headphone right channel
Ring	Output	GND	Ground for headphone and microphone
Sleeve	Input	MIC 2	Microphone input (for electret microphones incl. bias voltage of 3.3 V)

Connector: 3.5 mm jack plug (Pin assignment CTIA-compatible)

Not supported at the moment.

3.3.7 X10: MIC

Pin	Type	Name	Description
1	Input	MIC 1	Microphone input (for electret microphone incl. bias voltage of 3.3 V)
2	Input	GND	Ground

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.8 X12: SPK

Pin	Type	Name	Description
1	Output	SPK R +	Loudspeaker right channel (+) **Caution:** Floating ground!
2	Output	SPK R –	Loudspeaker right channel (–) **Caution:** Floating ground!
3	Output	SPK L +	Loudspeaker left channel (+) **Caution:** Floating ground! *Not supported at the moment.*
4	Output	SPK L –	Loudspeaker left channel (–) **Caution:** Floating ground! *Not supported at the moment.*

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.9 X14: LINE IN

Pin	Type	Name	Description
1	Input	LINE IN R +	Audio input right channel (Line level) *Not supported at the moment.*
2	Input	GND	Audio ground
3	Input	LINE IN L +	Audio input left channel (Line level) *Not supported at the moment.*
4	Input	GND	Audio ground

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.10 X16: LINE OUT

Pin	Type	Name	Description
1	Output	LINE OUT R +	Audio output right channel (Line level)
2	Output	GND	Audio ground
3	Output	LINE OUT L +	Audio output left channel (Line level) *Not supported at the moment.*
4	Output	GND	Audio ground

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.11 X18: audioRTBUS

Pin	Type	Name	Description
1	Bus	A	Bus connection A of *audioRTBUS*
2	Bus	B	Bus connection B of *audioRTBUS*
3	Output	DC IN	Voltage supply (+) *audioRTBUS* raw voltage of connector X2
4	Output	GND	Voltage supply ground *audioRTBUS*

Connector: Würth WR-TBL Serie 3221 (or compatible)

Not supported at the moment.

3.3.12 X20: RELAY

Pin	Type	Name	Description
1	Output	REL 11	Contact 1, Relay 1
2	Output	REL 12	Contact 2, Relay 1
3	Output	REL 21	Contact 1, Relay 2
4	Output	REL 22	Contact 2, Relay 2

Relay type: Normally opened, 1-Form-A

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.13 X22: LED

Pin	Type	Name	Description
1	Output	15V+	Common voltage supply for LEDs Caution: $U_{\text{Pin1}} = \text{DC IN} - 1.8\,\text{V}$ or max. $15\,\text{V}$
2	Output	LED 1	Connection of LED 1 (Open collector)
3	Output	LED 2	Connection of LED 2 (Open collector)
4	Output	LED 3	Connection of LED 3 (Open collector)
5	Output	LED 4	Connection of LED 4 (Open collector)
6	Output	LED 5	Connection of LED 5 (Open collector)

Connector: Würth WR-TBL Serie 3221 (or compatible)

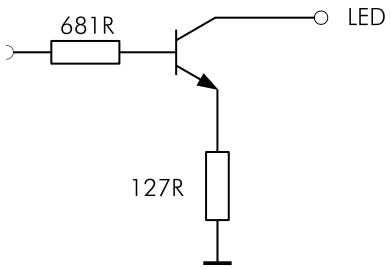

Figure 2: Internal circuit of LED outputs

3.3.14 X24: BUTTON

Pin	Type	Name	Description
1	Input	BTN 1	Connection of Button 1
2	Input	BTN 2	Connection of Button 2
3	Input	BTN 3	Connection of Button 3
4	Input	BTN 4	Connection of Button 4
5	Input	GND	Common ground for buttons

Connector: Würth WR-TBL Serie 3221 (or compatible)

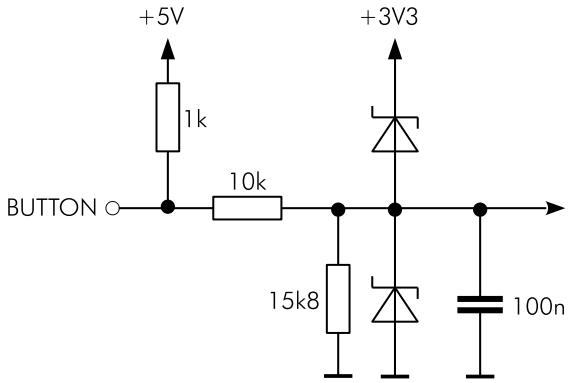

Figure 3: Internal circuit of button inputs

3.3.15 X26: IN

Pin	Type	Name	Description
1	Input	IN 1 +	Potential-free input 1 (+)
2	Input	IN 1 –	Potential-free input 1 (–)
3	Input	IN 2 +	Potential-free input 2 (+)
4	Input	IN 2 –	Potential-free input 2 (–)

Connector: Würth WR-TBL Serie 3221 (or compatible)

3.3.16 X28: UART

Pin	Type	Name	Description
1	Output	VDD	Voltage supply 3.3 V e.g. for external UART-RS-232-Adaptor
2	Input	RX	UART RX signal
3	Output	TX	UART TX signal
4	Output	GND	Ground

Connector: Header, 2.54 mm

Only for internal use by voice INTER connect GmbH.

3.3.17 X29: I2S

Pin	Type	Name	Description
1	Output	VDD	Voltage supply 3.3 V
2	Output	MCLK	Master clock
3	Output	BCLK	Bit clock
4	Input	DATA RX	Data RX
5	Output	DATA TX	Data TX
6	Output	SYNC	Frame sync
7	Output	GND	Ground

Connector: Header, 2.54 mm

Not supported at the moment.

3.3.18 X30: I2C

Pin	Type	Name	Description
1	Output	VDD	Voltage supply 3.3 V
2	Input	SDA	Data
3	Output	SCL	Clock
4	Output	GPIO	Control pin
5	Output	GND	Ground

Connector: Header, 2.54 mm

Not supported at the moment.

3.3.19 X31: SPI

Pin	Type	Name	Description
1	Output	VDD	Voltage supply 3.3 V
2	Input	MISO	Data input
3	Output	MOSI	Data output
4	Output	SCLK	Serial clock
5	Output	SS	Slave select
6	Output	GND	Ground

Connector: Header, 2.54 mm

Not supported at the moment.

3.3.20 X32: KEYPAD

Anschluss	Art	Bezeichnung	Beschreibung
1	In-/Output	KEY 1	Connection for row or column
2	In-/Output	KEY 2	Connection for row or column
3	In-/Output	KEY 3	Connection for row or column
4	In-/Output	KEY 4	Connection for row or column
5	In-/Output	KEY 5	Connection for row or column
6	In-/Output	KEY 6	Connection for row or column
7	In-/Output	KEY 7	Connection for row or column
8	In-/Output	KEY 8	Connection for row or column
9	In-/Output	KEY 9	Connection for row or column
10	Output	GND	Ground

The connection of the rows or columns can be designed completely freely and then assigned accordingly in the GUI. Any size of keypad with a maximum of 9 connections is supported (e.g. 1x8, 3x3 oder 5x4).

Connector: Header, double-row, 2.54 mm

Figure 4: Pin assignment for keypad

3.4 Dimensions

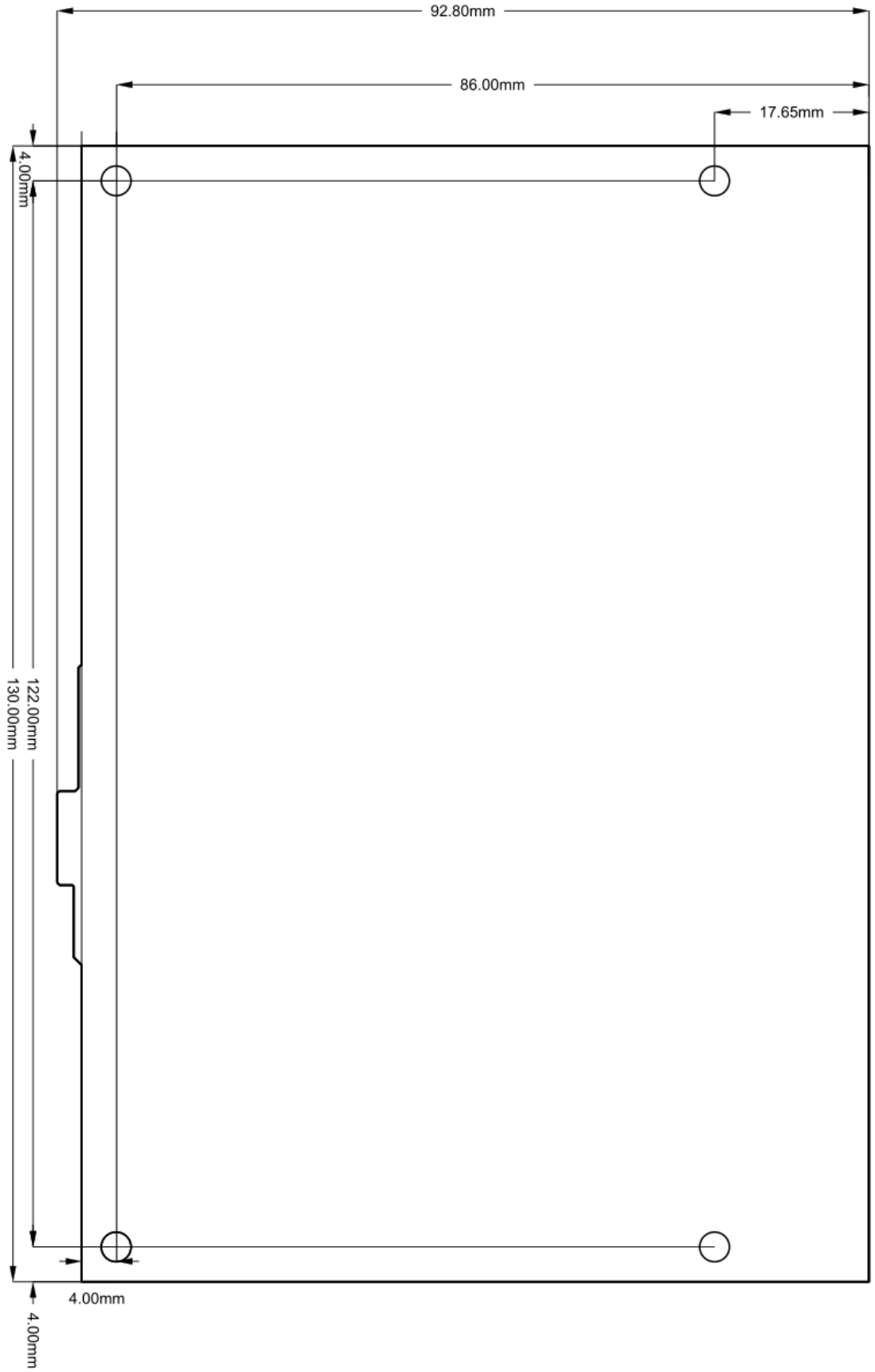

Figure 5: Dimensions of *vicCOM IP*

4 Software

4.1 Version

Description	Version
vicCOM IP	v3.0.0

4.2 Features

Symbol	Name	Value	Unit
$t_{Boot,SW}$	Boot time of software until functional use	approx. 1:10	min
$t_{Boot,GUI}$	Boot time of software until use of GUI	approx. 1:30	min
$t_{Factory,GUI}$	Boot time of software while doing factory reset until use of GUI	approx. 2:40	min
f_s	Sampling rate of signalprocessing	16	kHz

4.3 Status display

The software is able to show it is own status via the on-Board LEDs:

Status of the software	red LED	yellow LED	green LED
off	–	–	–
Bootloader is loading	x	–	–
Kernel is loading	–	x	–
Application is running	–	–	x
Factory reset is active	x	x	x
Emergency IP is active	x	–	x

4.4 Update

The software can be updated (only) via the web interface, see Section 5.4.

4.5 Open Source Software

The *vicCOM IP* uses Open Source Software (OSS). A list of the software used and its licences can be found in the document 'OSS Licence vicCOM IP'. The document can be downloaded from the website https://www.voiceinterconnect.de/en/viccom-ip.

4.6 Factory Reset

The *vicCOM IP* offers two ways of reset the platform to factory default settings:

1. via Web interface, see Section 5.4
2. In case that access via the web interface is no longer possible, a jumper must be inserted on the platform as shown in Figure 6. During the following (manual) reboot, the platform signals the successful restoration of factory settings with the LED pattern, see Section 4.3. (The jumper must now be removed.)

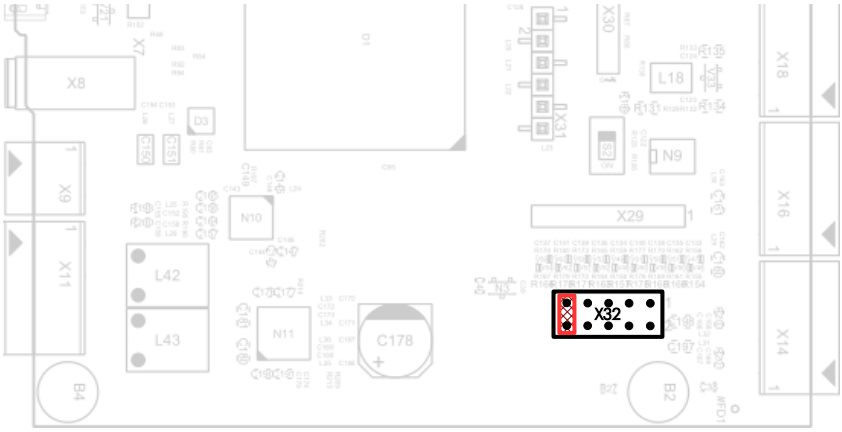

Figure 6: Jumper position for factory reset while rebooting

4.7 Emergency IP Address

If no DHCP server is available when the *vicCOM IP* is used the first time or if the IP address was set incorrectly, the emergency IP address can be activated using a jumper (see Figure 7). The jumper must be plugged in when booting the *vicCOM IP*. Successful activation is signalled by the on-board LEDs using the pattern, see Section 4.3. (The jumper must now be removed.)

The emergency IP address is permanently set to: `192.168.10.67`

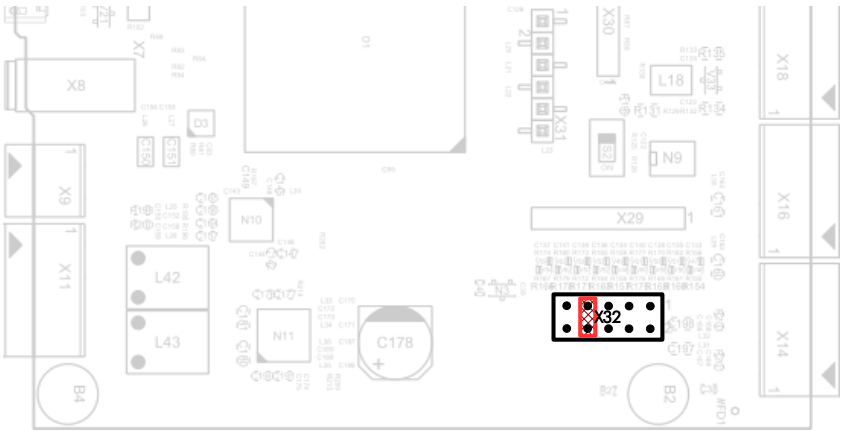

Figure 7: Jumper position to activate the emergency IP address while rebooting

5 Configuration

The *vicCOM IP* is a platform for IP communication. Typical states in the call flow can be configured via a web interface (GUI) with regard to the operating and display elements involved. The following sections describe the configuration options for these states.

The *vicCOM IP* comes by default with an activated DHCP client. The connected network has to assign an IP address to the *vicCOM IP*.

5.1 Login

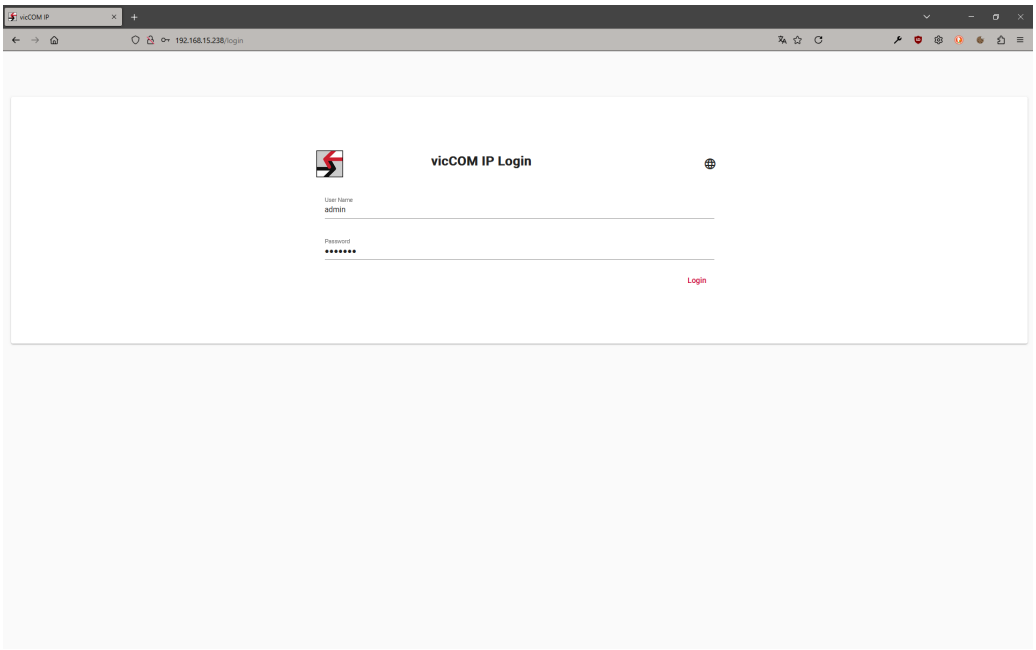

Figure 8: Login screen of GUI

The GUI of *vicCOM IP* can be accessed by default at standard http port 80 of the assigned IP address:

```
http//:{IP address}
```

In the system settings of the GUI (Section 5.4) the communication can also be configured to the secure HTTPS connection after successful login.

The *vicCOM IP* comes by default with the following user account:

User name: `admin`
Password: `default`
(Role: `admin`)

5.2 Status

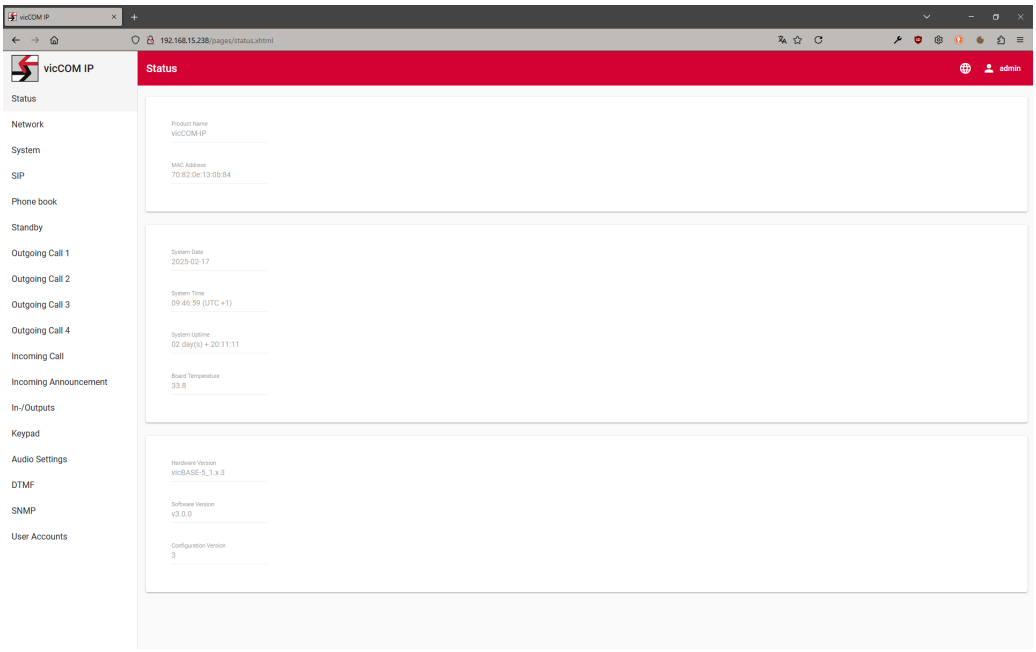

Figure 9: 'Status' page of GUI

After logging in the first page displayed is the status page. The status page contains general data, such as the MAC address of the platform, system date and time and version information.

5.3 Network

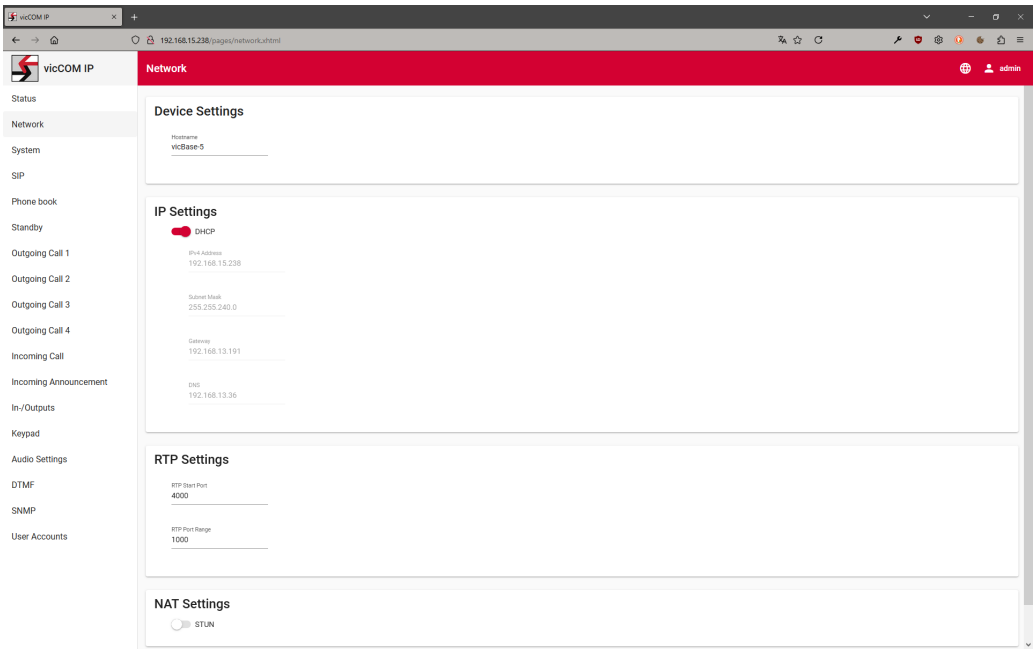

Figure 10: 'Network' page of GUI

Device Settings

- Hostname: freely selectable name of the platform in the network (change requires reboot)

IP Settings

- DHCP on: use of the DHCP client to automatically obtain the network settings of a DHCP server (change requires reboot)
- DHCP off: manual configuration of all network settings (change requires reboot)
  Attention: incorrect settings lead to the platform no longer being accessible (can only be resolved by resetting to factory defaults or to emergency IP adress via jumper, see Section 4.6 or Section 4.7)

RTP Settings

- RTP Start Port: Start value of the port range used for the RTP audio streams
- RTP Port Range: Range of ports used from the start value for the RTP audio streams

NAT Settings

- STUN off: STUN functionality is switched off
- STUN on: STUN functionality is switched on (Information exchange of the public network address for a direct speech connection of intercom units behind NAT firewalls, change requires reboot)
  - STUN Server Connection: Status display of the connection to the STUN server or alternative STUN server

- Server: IP address of the STUN server
- Server Port: Port number of the STUN server
- alternative Server: IP address of the alternative STUN server
- Server Port: Port number of the alternative STUN server

5.4 System

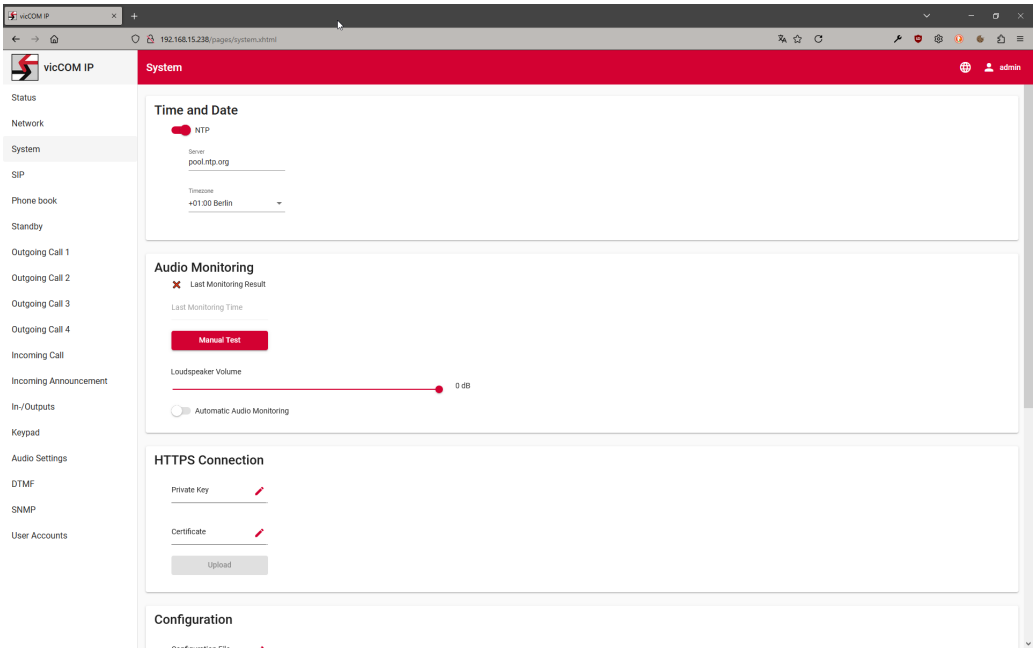

Figure 11: 'System' page of GUI

Time and Date

Note: The platform maintains the system time during short interruptions of the power supply (approx. 1 min).

- NTP on: the date and time is automatically obtained from the configurable NTP server, additionally a time zone can be selected (automatic change for daylight saving time)
- NTP off: the date and time must be set manually

Audio Monitoring a test tone played by the loudspeaker is recorded and evaluated by the microphone to check the function of the acoustic components

- Last Monitoring Result: if the audio self-test fails, a red cross is displayed, if successful, a green circle is displayed
- Last Monitoring Time: Display of the time when the audio monitoring was last carried out (manually or automatically)
- Button 'Manual Test': Manual execution of the audio monitoring
- Loudspeaker Volume: setting the volume for the audio monitoring
- Automatic Monitoring on: audio monitoring is only executed if it is started manually by the button
- Automatic Monitoring off:
  - First Monitoring Time: time at which the automatic audio monitoring is executed for the first time
  - Time Interval: interval at which the automatic audio monitoring is carried out in relation to the first monitoring time (in minutes)

– Max. Attempts: the maximum number of automatic audio monitorings in case of a previous faulty test result
Note: The time between two attempts is 30 s.

HTTPS Connection by uploading a private key and an associated certificate file, after a reboot the connection to the web interface is active via the secured HTTPS connection on its default port 443
Attention: If at least one of the two files does not correspond to the expected content, the upload is rejected and the HTTPS connection cannot be started.

Configuration

- Import: the configuration previously exported from another (same version) platform is selected on the local PC and uploaded via the button 'Import'
- Export: the current configuration of the platform is downloaded to the local PC via the browser
  Note: When manually editing the exported configuration, care must be taken to comply with the file format!

Service the 2 buttons 'Factory Reset' and 'Reboot' can be used to start the selected action

Firmware Update by uploading the firmware update provided by *voice INTER connect GmbH*, the platform can be adapted to the respective software version
Note: The settings of the platform will remain.

5.5 SIP

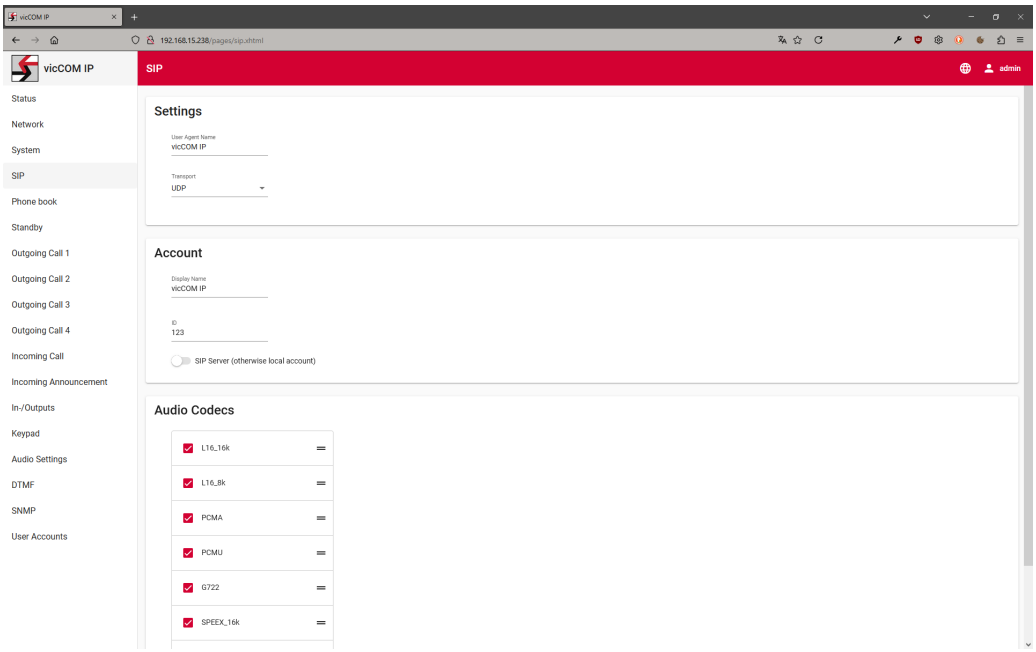

Figure 12: 'SIP' page of GUI

Settings

- User Agent Name: Name of the SIP intercom that is transmitted at SIP protocol level
- Transport: Selection of the SIP transport protocol (UDP or TCP)

Account

- Display Name: name transmitted to the remote terminal during a call
- ID: ID of SIP participant
- SIP Server off: the local SIP account is active, so the platform can be called directly via the SIP URI (ID@IP number)
  Note: Before the first call, the incoming calls must first be configured on the corresponding page.
- SIP Server on:
  - SIP Registration: successful registration with the SIP server is represented by a green circle, unsuccessful registration by a red cross
  - Login: entering the login lame of the SIP account
  - Passwort: entering the password of the SIP account
  - Server: entering the ip number of the SIP server
  - Server Port: adjusting the port used on the SIP server (standard port: 5060)
  - Re-Registration: adjusting the interval for re-registration with the SIP server (in seconds)

Audio Codecs all audio codecs provided by the platform for a speech connection are displayed – each codec can be switched on or off and moved in priority with the mouse via drag&drop (first entry = highest priority)

5.6 Phone Book

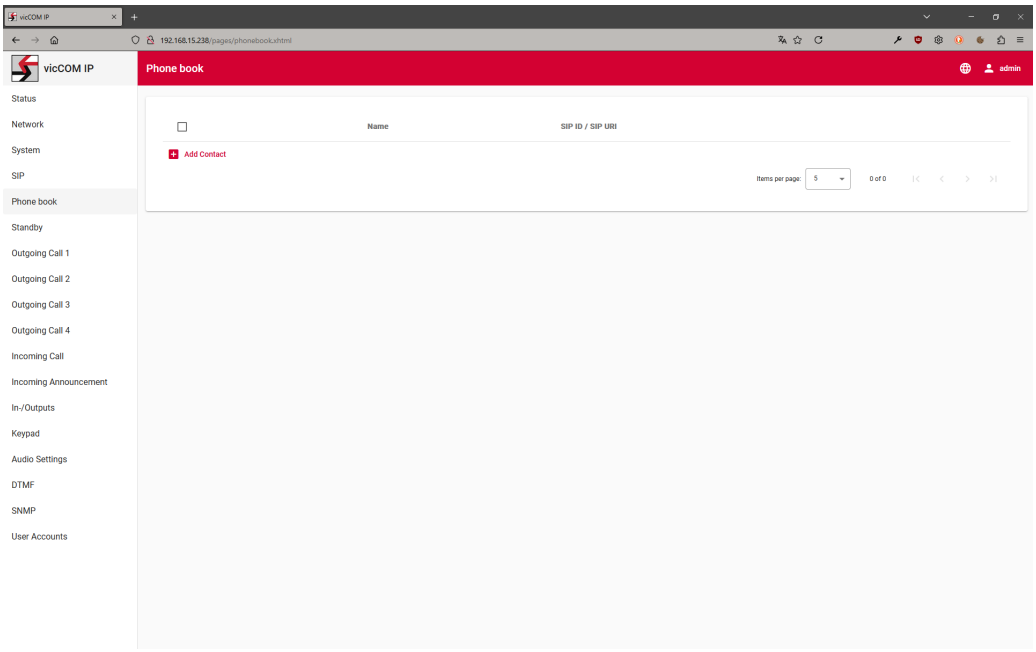

Figure 13: 'Phone book' page of GUI

All contacts are managed in the phone book.

Note: For outgoing calls, only call targets from the telephone book can be selected.

5.7 Standby

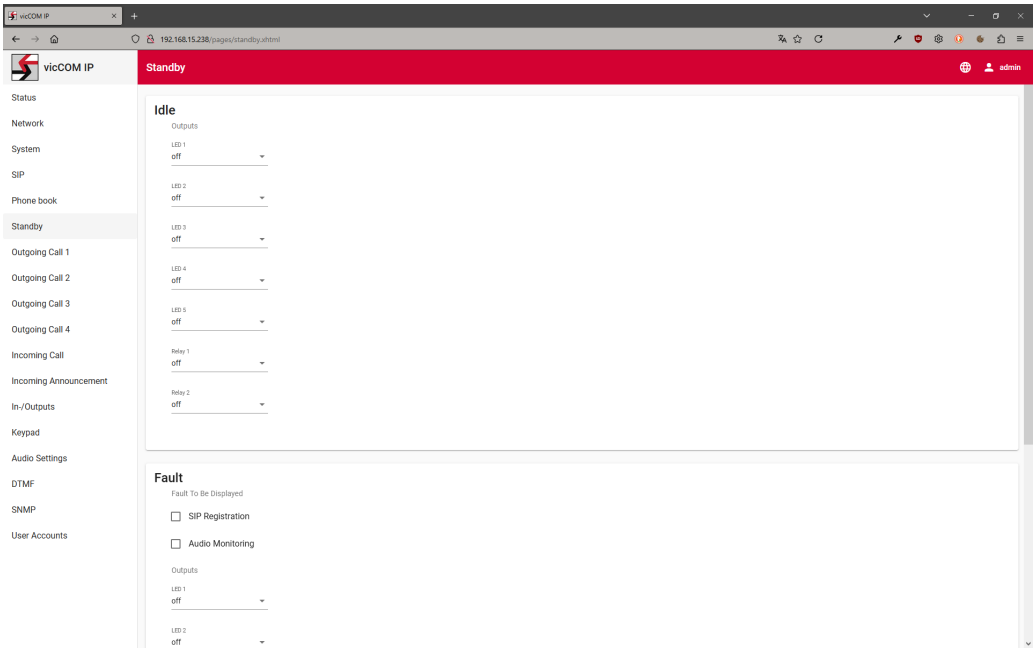

Figure 14: 'Standby' page of GUI

Idle Here all outputs are configured for standby when the *vicCOM IP* is idle. The changes are applied immediately after pressing the button 'Apply'.

Fault Here all outputs are configured for standby when the *vicCOM IP* is faulty. The fault case is displayed as an alternative to the idle case in the standby state. The check boxes can be used to select what is to be considered a faulty function.

Note: The settings to be selected (e.g. *blink* and *flash*), can be configured on the 'In-/Outputs' page, see Section 5.11

5.8 Outgoing Call 1|2|3|4

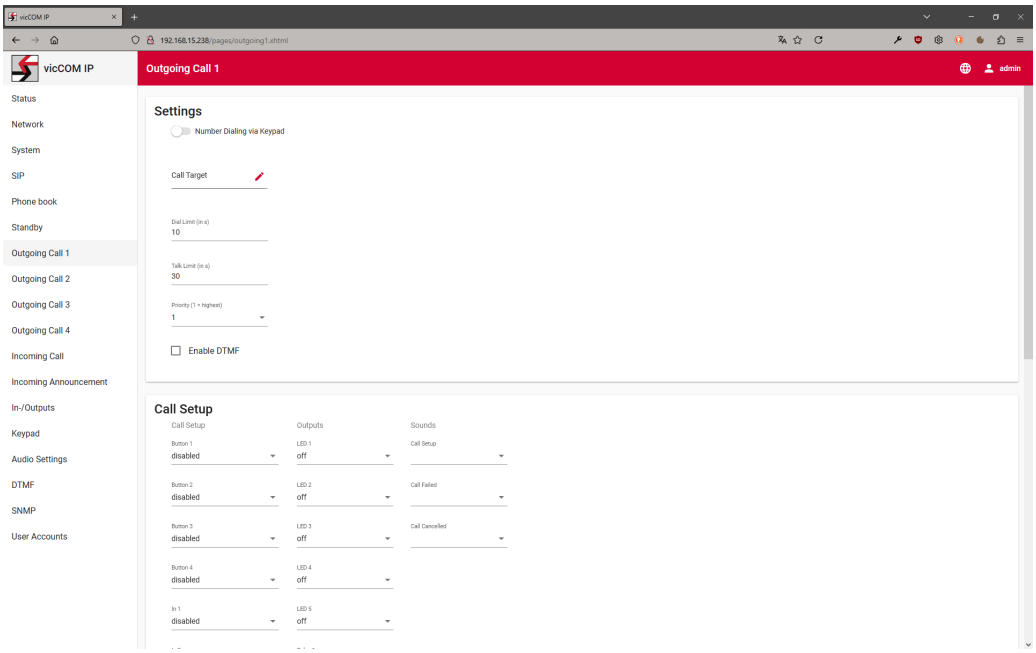

Figure 15: 'Outgoing Call' page of GUI

Settings

- Number Dialing via Keypad on: the number for the call target is entered directly via the keypad and not via the call target entry (call target entry is hidden when number dialing entry is active)
- Number Dialing via Keypad off: the number from the call target entry is used
- Call Target: Selecting a call target from the phone book
- Dial Limit: maximum time attempted to reach the call target (in seconds) – after that the call is cancelled and returned to the standby
  Note: A limit time of 0 disables the limit.
- Talk Limit: maximum time for a speech connection (in seconds) – after that the connection is cancelled and returned to the standby
  Note: A limit time of 0 disables the limit.
- Priority: calls with higher priority cancel existing, low-priority calls/announcements and are set up instead (e.g. SOS calls cancel info calls); there are 9 priority levels, 1 being the highest priority
- DTMF active: the DTMF settings (see Section 5.14) are applied

Call Setup

- Call Setup: each input can be configured to activate a call, as an alternative to the directly connectable buttons, a key can also be selected from a previously configured keypad
  Note: the *short press*, *long press* and *very long press* settings to be selected can be configured on the 'In-/Outputs' page, see Section 5.11

- Outputs: setting the behaviour of the outputs during the call setup
- Sounds: selection of an acoustic signal for the start of call setup, on detection of a failed call (e.g. remote station does not answer) and a cancelled call
  Note: It is currently only possible to choose from the existing sounds of the platform.
  Note 2: The volume of the sounds can be set independently of the talking volume, see 'Audio Settings'.

Talk Setup

- Cancel Call: each input can be configured to cancel a call, as an alternative to the directly connectable buttons, a key can also be selected from a previously configured keypad
- Outputs: setting the behaviour of the outputs during the talk
- Sounds: selection of an acoustic signal for the end of the call

5.9 Incoming Call

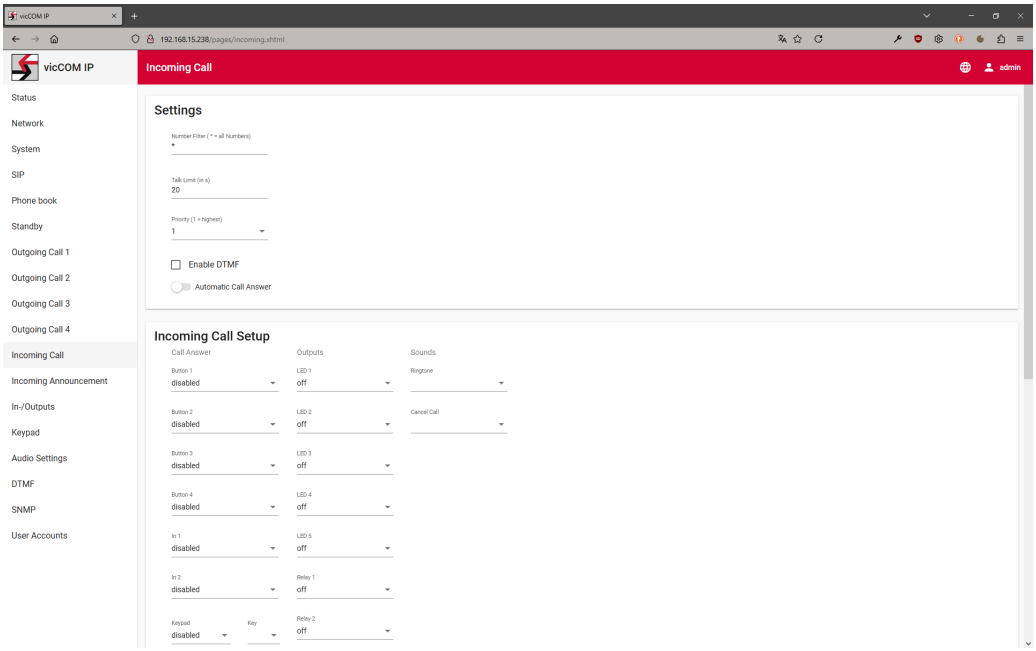

Figure 16: 'Incoming Call' page of GUI

Settings

- Number Filter:
  - '*': all numbers have permission to call
  - ' ': no number has permission to call
  - 'SIP-URI' or 'telephone number': only this number has permission to call
- Talk Limit: maximum time for a speech connection (in seconds) – after that the connection is cancelled and returned to the standby
  Note: A limit time of 0 disables the limit.
- Priority: calls with higher priority cancel existing, low-priority calls/announcements and are set up instead; there are 9 priority levels, 1 being the highest priority
- DTMF active: the DTMF settings (see Section 5.14) are applied
- Automatic Call Answer off: no automatic call answer
- Automatic Call Answer on: automatic call answer after an adjustable delay time (in seconds)
  Note: A delay time of 0 means immediate call answer without a ring tone.

Incoming Call Setup

- Call Answer: each input can be configured to answer a call, as an alternative to the directly connectable buttons, a key can also be selected from a previously configured keypad
  Note: the *short press*, *long press* and *very long press* settings to be selected can be configured on the 'In-/Outputs' page, see Section 5.11

- Outputs: setting the behaviour of the outputs during incoming call
- Sounds: selection of an acoustic signal as a ring tone and a cancelled call
  Note: It is currently only possible to choose from the existing sounds of the platform.
  Note 2: The volume of the sounds can be set independently of the talking volume, see 'Audio Settings'.

Talk Setup

- Call End: each input can be configured to cancel a call, as an alternative to the directly connectable buttons, a key can also be selected from a previously configured keypad
- Outputs: setting the behaviour of the outputs during the talk
- Sounds: selection of an acoustic signal for the end of the call

5.10 Incoming Announcement

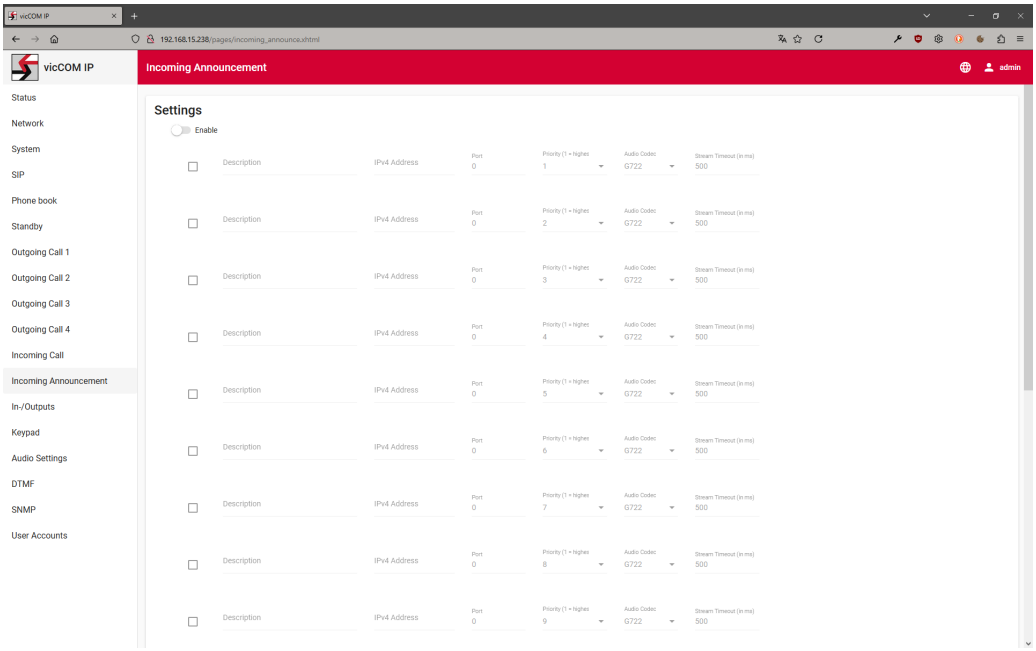

Figure 17: 'Incoming Announcement' page of GUI

Settings

- Enable: the receiving of all announcements can be activated or deactivated together
- Checkbox: a single announcement can be activated or deactivated
- Description: Field for describing the announcement to the user (without functional significance)
- IPv4 Address: the receiving address of the announcement
- Port: the receiving port of the announcement
- Priority: Announcements with higher priority cancel existing, low-priority calls and are set up instead; low-priority announcements are interrupted by higher-priority announcements; there are 9 priority levels, 1 being the highest priority
- Audio Codec: Specifying the audio codec used for announcements
  Attention: If an incorrect audio codec is selected, zero data is played back.
- Stream Timeout: Time after which an announcement is locally considered to be finished if there is no longer an audio stream (in milliseconds)

Announcement

- Outputs:setting the behaviour of the outputs during the announcement
- Sounds: selection of an acoustic signal for start or end of an announcement
  Note: It is currently only possible to choose from the existing sounds of the platform.
  Note 2: The volume of the sounds can be set independently of the talking volume, see 'Audio Settings'.

5.11 In-/Outputs

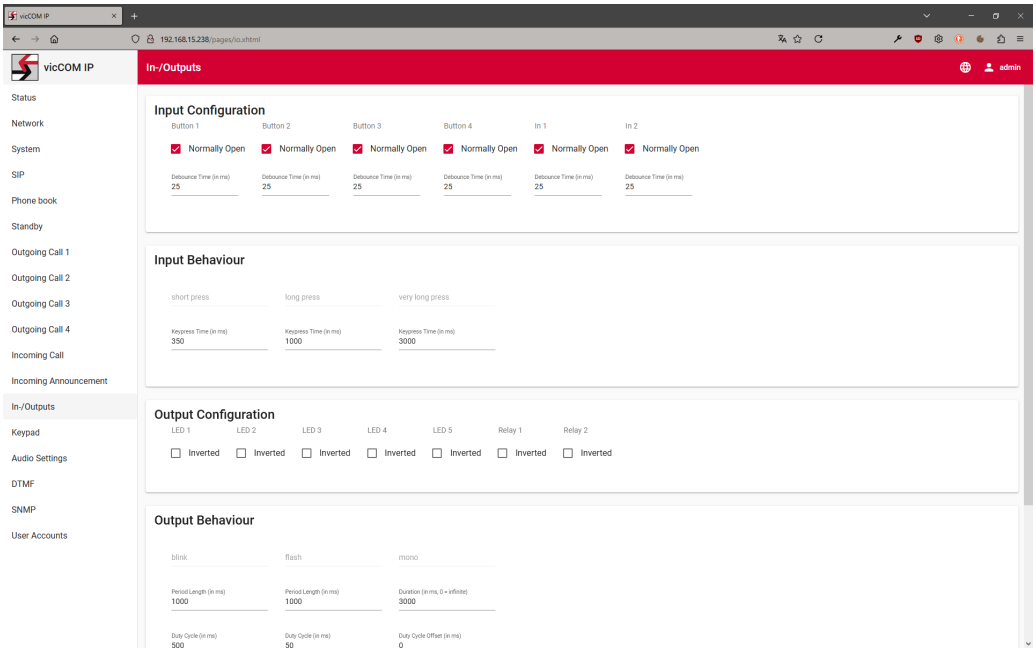

Figure 18: 'In-/Outputs' page GUI

All button connections (X24) and the two potential-free inputs (X26) serve as inputs. The LED outputs (X22) and the two relay outputs (X20) are available as outputs.

Input Configuration

- Normally Open: if the checkbox is activated, normally open contacts are expected at the inputs; if the checkbox is deactivated, normally closed contacts can be connected
- Debounce Time: debounce time of the connected button (in milliseconds)
  Note: An incorrect debounce time can lead to malfunctions. The debounce time of the connected button should be taken from the data sheet of the button or measured.

Input Behaviour there are 3 configurations with fixed names for different behaviours (see Figure 19):

- 'short press': configuration of a keystroke that is triggered within a maximum actuation time (in milliseconds), i.e. the keystroke must be completed before the configured time
- 'long press': configuration of a keystroke that is triggered after a minimum actuation time (in milliseconds), i.e. the keystroke must still continue at the configured time
- 'very long press': like 'long press', only with alternative actuation time

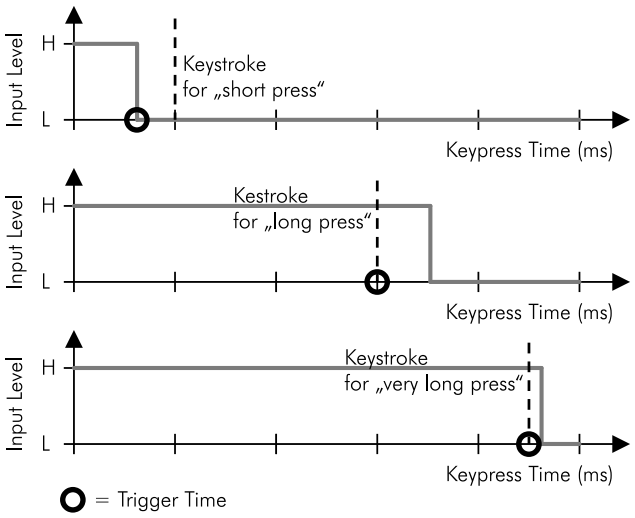

Figure 19: Configuration of Input Behaviour (Keystroke detection)

Output Configuration

- Inverted: if the checkbox is deactivated, the deactivated state of the output is 'off' (= 0), if the checkbox is activated, the deactivated state of the output is 'on' (= 1)

Output Behaviour there are 3 configurations with fixed names for different behaviours:

- 'blink': configuration for setting a blinking pattern
- 'flash': like 'blink', only with alternative blinking pattern
- 'mono': configuration for a time-limited on-time

Note: The output behaviour can be time limited for all configurations (Duration).

5.12 Keypad

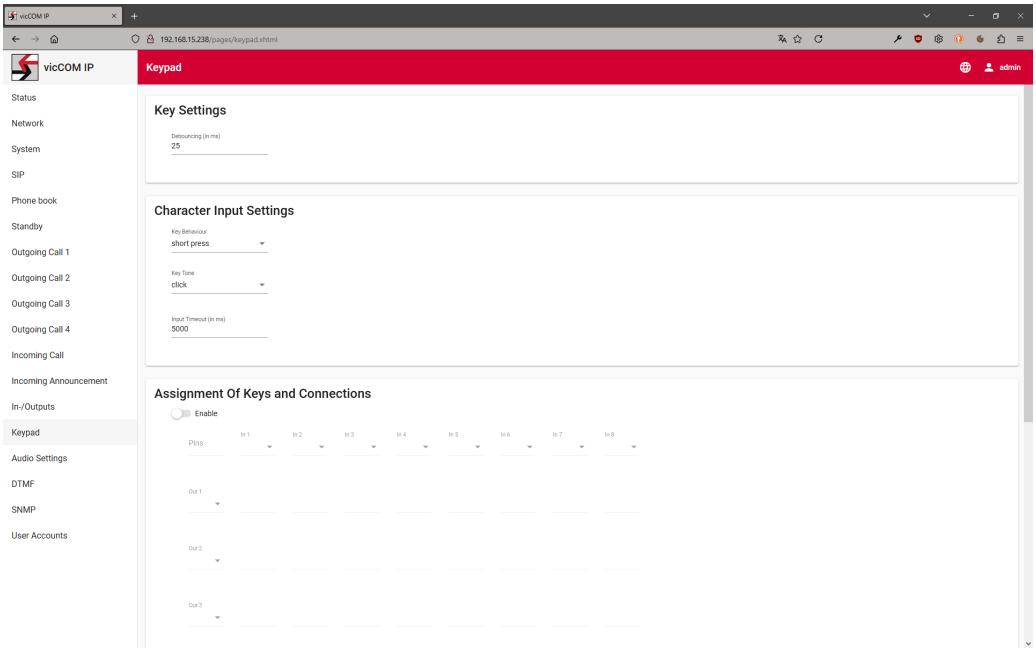

Figure 20: 'Keypad' page of GUI

The keypad connector can be used for all sizes of matrix keypads up to a maximum of 9 connections. This supports a variety of keyboard layouts, such as `1x8`, `3x3` oder `4x5`. The labelling of the keys can be flexibly adjusted.

Key Settings

- Debouncing: debounce time of the keys of the connected keypad (in milliseconds)
  Note: An incorrect debounce time can lead to malfunctions. The debounce time of the connected keypad should be taken from the data sheet of the keypad or measured.

Character Input Settings

- Key Behaviour: selection between *short press*, *long press* and *very long press*, similar to the button configurations for outgoing and incoming calls
- Key Tone: feedback on keyboard input, the use of the short 'click' sound is recommended
- Input Timout: time (in milliseconds) after which the input buffer of the keypad input is deleted so that no input remains after a longer interruption

Assignment Of Keys and Connections

- Enable: global switch to activate/deactivate the keypad connector
- Pins Out 1 – Out 8: assignment of the outputs of the *vicCOM IP* to the keypad matrix
- Pins In 1 – In 8: assignment of the inputs of the *vicCOM IP* to the keypad matrix
- Intersection of Out and In: enter the character of the keypad
  Note: Is also used as a DTMF character when DTMF-Send is activatet.

5.13 Audio Settings

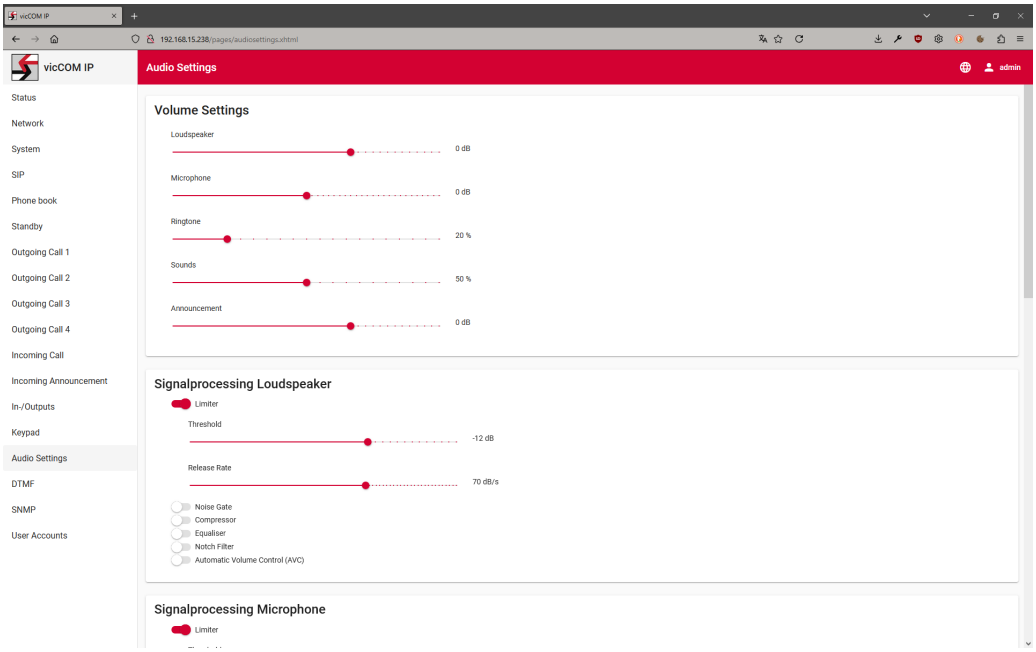

Figure 21: 'Audio Settings' page of GUI

The *vicCOM IP* has extensive settings for microphone, loudspeaker, noise and echo cancellation. Specific explanations can be requested separately from the *voice INTER connect GmbH*. The most common settings are:

Volume Settings

- Loudspeaker: Volume of Loudspeaker (in dB)
- Microphone: Amplification of microphone signal (in dB)
- Ringtone: Volume of ringtone Klingeltons in relation to volume of loudspeaker (in %)
- Sounds: Volume of all sounds in relation to volume of loudspeaker (in %)
- Announcement: Volume of Announcements (in dB)

5.14 DTMF

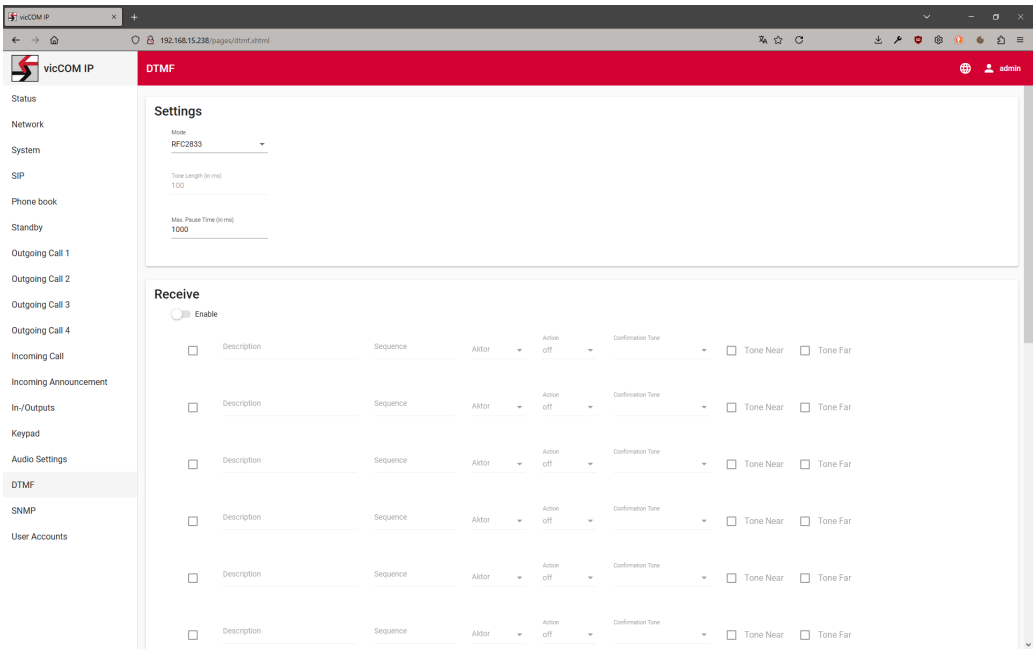

Figure 22: 'DTMF' page of GUI

Settings

- Mode: selection between transmission mode `RFC2833` or `SIP INFO`
- Tone length: Length of the DTMF tone (in milliseconds)
  Note: The length is currently not freely configurable, but is set to 100 ms.
- Max. Pause Time: Time (in milliseconds) after which the receive buffer of the DTMF receiver is cleared so that no received character/string remains after a longer interruption

Receive

- Enable: global switch to activate/deactivate the receiving of DTMF
- Checkbox: a single DTMF sequence can be activated or deactivated
- Descriptions: Field for describing the sequence for the user (without functional significance)
- Sequence: DTMF sequence to be received
- Actor: selection of an actuator (output of the *vicCOM IP*) that is to be controlled
- Action: selection of an output behaviour of the actuator
- Confirmation Tone: selection of a sound that is played when the sequence is successfully received
- Ton Near: activate/deactivate the confirmation tone on the receiver (local)
- Ton Far: activate/deactivate the confirmation tone on the sender

Send

- Enable: global switch to activate/deactivate the sending of DTMF
- Enable Keypad: activating/deactivating the generation of DTMF tones by the keypad
- Ton Near: activate/deactivate the DTMF tone on the sender (local)
- Button 1 – In 2: button behaviour, selection between *short press*, *long press* and *very long press*, similar to the button configurations for outgoing and incoming calls
- Character: Enter the character that is sent via DTMF
  Note: It is currently not possible to send sequences.

5.15 SNMP

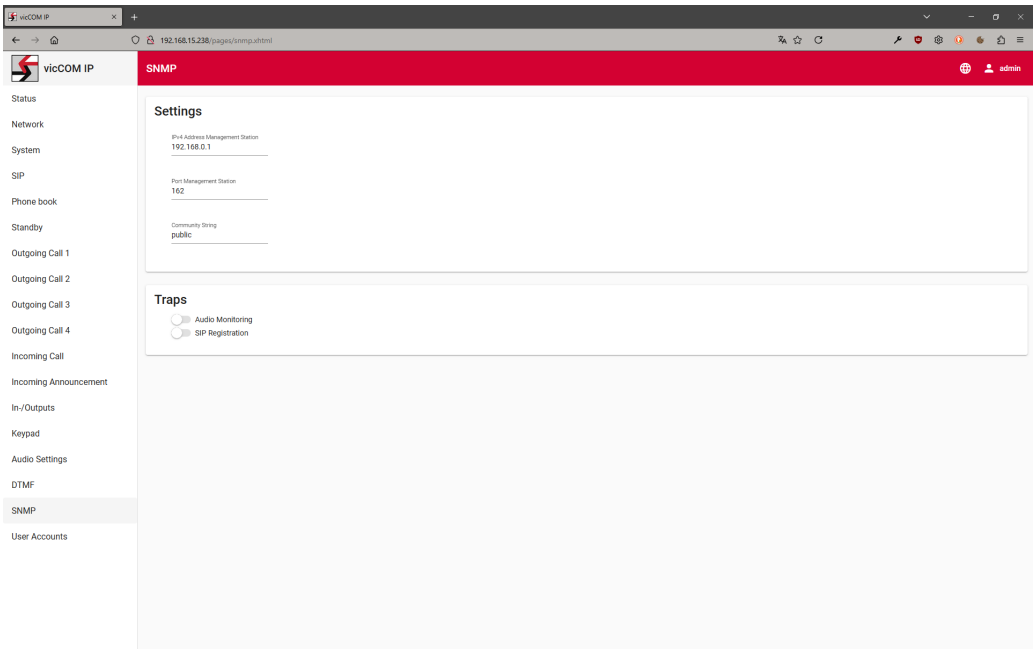

Figure 23: 'SNMP' page of GUI

The *vicCOM IP* can send properties of the platform via SNMP traps to an SNMP server. Currently only 2 SNMP traps are enabled.

Settings

- IPv4 Adresse Managment Station: IP address of SNMP Server in IPv4 format
- Port Managment Station: Receiving port for SNMP messages of SNMP Server
- Community String: configurable string of community name

Traps

- Audio Monitoring off/on: no SNMP trap/an SNMP trap is sent for audio self-tests
- SIP Registration off/on: no SNMP trap/an SNMP trap is sent for SIP registrations

Each trap can be configured as follows:

- OID Trap: configurable Object ID of the trap
- OID Description: configurable Object ID of the trap description
- Description: configurable string as description of the trap
- OID Status: configurable Object ID of status of the trap
- States: possible states of the traps (not changeable and separated with comma)

5.16 User Accounts

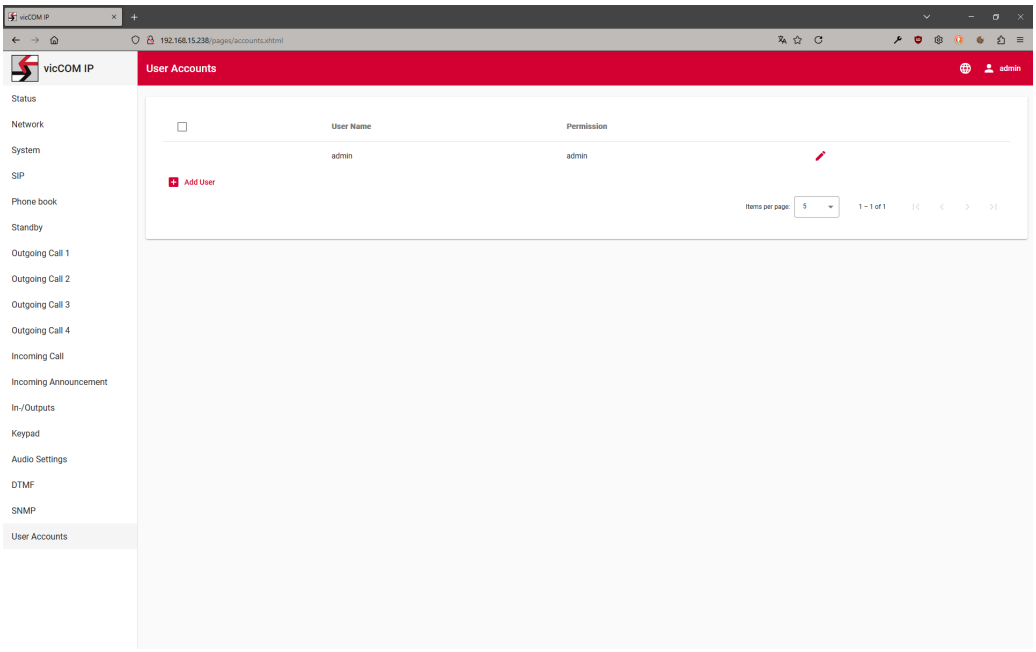

Figure 24: 'User Accounts' page of GUI

The GUI of *vicCOM IP* provides a management of user accounts. The user accounts are devided in 3 different roles. Each user can be assigned to one of three roles:

admin: full access to all data and configurations; creating and deleting of user accounts

service: full access to all data and configurations except: firmware update, configuration export/import, personal data of the telephone book and the user accounts

user: full access to personal data; restricted access to configurations