

IP Substations

INSTALLATION & CONFIGURATION GUIDE



About this Document

Document Scope

This document describes the installation and configuration of the various models of the STENTOFON IP Substation range.

Publication Log

| Rev. | Date | Author | Status/Comments |
|------|-------------|--------|---|
| 1.0 | 25 Mar 2010 | HKL | Supersedes IP Substation Mounting Guide |
| 1.1 | 07 Apr 2010 | HKL | dimensions specs corrected |
| 1.2 | 30 Apr 2010 | HKL | assembly kit mounting |
| 1.3 | 16 May 2011 | HKL | config parameters |
| 2.0 | 20 Dec 2011 | HKL | Screenshots for new station SW |

Related Documentation

For further information, refer to the following documentation:

| Doc. no. | Documentation |
|------------|--|
| A100K10805 | AlphaCom XE Installation & Configuration |
| A100K10788 | IP Master Station Installation & Configuration |
| A100K11061 | IP Substation Getting Started |

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1 Introduction

The STENTOFON IP Substations are connected to the AlphaCom XE server/exchange which is the heart of the STENTOFON security and communication system. The communication between the AlphaCom XE server/exchange and the IP Substations utilize the STENTOFON CCoIP® protocols. The CCoIP protocols allow for a wide set of call modes and services that provide the ideal solution for your critical communication requirements.

The AlphaCom XE server/exchange includes all main service configurations for the IP stations and only a minimum configuration is needed to be carried out on the actual substation. For further details, see *A100K10805 AlphaCom XE Installation & Configuration Manual*.

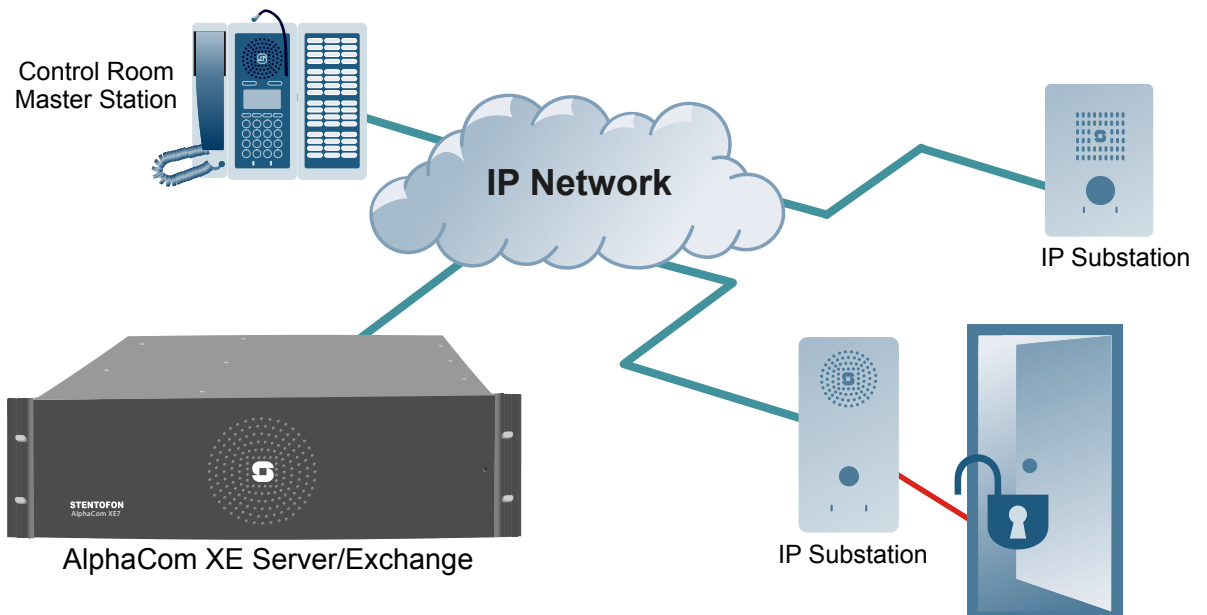


Figure 1 STENTOFON Security and Communication System

1.1 Vandal Resistant IP Substation

- part no. 1008041100

The STENTOFON Vandal Resistant IP Substation is tough, durable and resilient, and designed for use in the harshest of environments. The station is typically used as a communication, information or emergency point and connects directly to the IP network making it easy to deploy – anywhere and at any distance.

Designed for CCoIP the station offers a set of critical communication features such as integrated firewall, group call, call priority and override, to name just a few. This enables instant, efficient and secure voice and data services in an IP environment.



1.2 Vandal Resistant IP Substation (3 Gang)



- part no. 1008051000

The STENTOFON Vandal Resistant IP Substation is tough, durable and resilient, and designed for use in the harshest of environments. The station is typically used as a communication, information or emergency point and connects directly to the IP network, making it easy to deploy. The station offers a set of critical communication features such as integrated firewall, group call, call priority and override. Like all STENTOFON stations, this IP substation features superb audio quality. This substation comes with a 3 gang backbox for wall mounting.

1.3 IP Substation Kit



- part no. 1008090200

The IP Substation Kit features the printed circuit board (PCB) as used in IP Substations. It is designed to make custom IP substations to the highest specifications and for use in the harshest environments. Designed for CCoIP® the station card offers a set of critical communication features such as integrated firewall, group call, call priority and override. This enables instant, efficient and secure voice and data services in an IP environment. Superb audio quality is enabled through a set of advanced technologies such as active noise filtering, acoustic echo cancellation, wide band audio codec, and mid power Class D audio outputs.

2 Installation

2.1 Introduction

The table below is an overview of the main connectors involved when installing the STENTOFON IP Substations.

| | |
|--------------|---|
| LAN | 10/100 Mbps RJ45 port for LAN (uplink) connection. Supports PoE (802.3af). Draws power from either spare line or signal line. |
| AUX | 10/100 Mbps RJ45 ports for auxiliary equipment such as PC and IP camera. |
| Input/Output | Pluggable screw terminal |
| Local Power | Pluggable screw terminal, 19-27 VDC Idle 4W, max. 8W |

Table 1 Substation Connectors

2.2 Power Supply

The IP Substation supports Power over Ethernet (PoE, IEEE 802.3 a-f) where power can be drawn from either the spare line or signal line.

If PoE is not available, the IP Substation can be connected to a 24 VDC local power supply. Refer to *Appendix A: Substation Board Connections* to see where to connect local power.

2.3 Network Connection

There are two RJ45 ports on the PCB of the IP Substation:

- The LAN port (P1) is for connecting to the network and the AlphaCom server/exchange.
- The AUX port (P2) is for connecting to auxiliary equipment such as a PC.

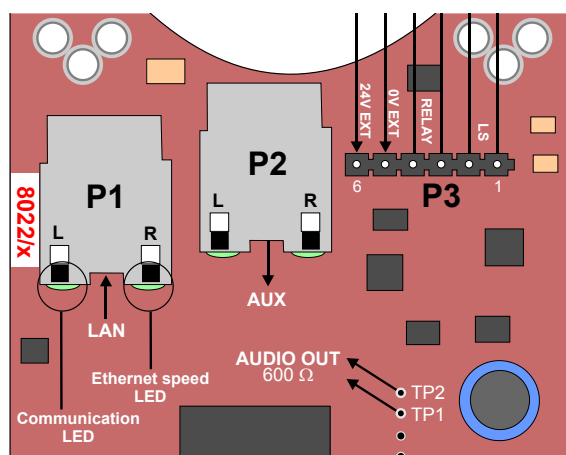


Figure 2 RJ45 Ports (P1 & P2) on PCB of IP Substation

2.4 Input/Output Connections

The I/O connection options for the IP Substations include:

- 3 digital inputs (P4)
- 1 logical output (TP9)
- 1 relay output (P3)

These connections are used as relay contacts for door lock control and external I/O devices.

For pin settings on the connectors on the substation board, see *Appendix A: Substation Board Connections*.

3 Configuration

A web browser is used for the configuration of the IP Substation.

For substation configuration, there are essentially three parameters to set:

- AlphaCom IP address
- Substation directory number
- Substation IP address

⚠ *Advanced configuration settings as described in section 3.2 are not mandatory for the substation to function properly.*

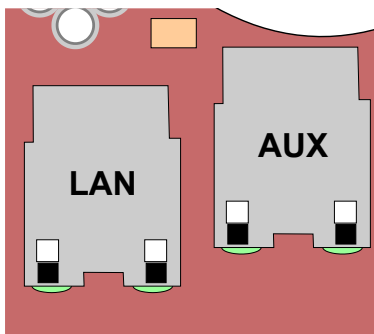
3.1 Configuration via Web Browser

3.1.1 IP Substation Web Interface

The IP Substation features an embedded web server, which allows users to log in via a standard web browser.

At commissioning, the IP substation needs to be configured to enable it to subscribe to an AlphaCom server/exchange. To do this, your PC and the IP substation have to be connected together via a PoE switch using network cables:

- Connect the PC to the PoE switch
- Connect the LAN port on the IP substation to the PoE switch



The factory default IP address of the substation is **169.254.1.100**. In order for your PC to communicate with the substation it is necessary to change its **Internet Protocol Properties** to use an IP address that is in the same range as 169.254.1.100, e.g. 169.254.1.1 with subnet mask 255.255.255.0.

After the IP properties have been changed, access the substation by logging into the web interface using a standard web browser:

1. Open a web browser
2. In the browser's address bar, type the default IP address **169.254.1.100** and press the ENTER key
 - The station login page will be displayed



To log into the substation:

1. Click **Login**
2. Enter the default User name: **admin**
3. Enter the default password: **alphaadmin**

The **Station Information** page will now be displayed, showing the IP substation configuration including the MAC address which needs to be entered into the AlphaPro programming tool.

Use the menu bar at the top of each page to browse through the different pages.

3.1.2 Station Main Settings

- Click **Station Main > Main Settings** to access the page for configuring station mode and IP parameters.



Station Mode

- Select the **Use Alphascom** radio-button

Registration Settings

- Enter the IP address of the AlphaCom server/exchange in which the IP substation is to be a subscriber in the **AlphaCom IP-address** field.
- Enter the directory number of the substation in the **Directory Number** field.
 - If a directory number is not entered, the substation will register with its MAC address. The MAC address is found on the Station Info page and needs to be entered into the AlphaPro programming tool.

CCoIP Station – IP Settings

- **DHCP** – Use this option if the IP substation shall receive IP Settings from a DHCP server.
- **Static IP** – Select this option if the IP station shall use a static IP address. Enter values for:
 - **IP-address**
 - **Subnet-mask**
 - **Gateway**
- Click **Save** followed by **Apply** to apply the new configuration settings.

3.2 Advanced Configuration Options

⚡ *The configuration settings described in this section are not mandatory.*

3.2.1 Noise Reduction

Active noise reduction uses advanced signal processing algorithms in the IP station. These algorithms will try to identify the noise signal (background repetitive audio). When noise is identified, the algorithm filters out the noise while retaining the voice signal. If you set noise reduction at a high level, more of the voice signal will also be filtered out.

The range of filtering levels are from 0 to 7 for the substation characteristics to be tuned optimally to the environment. The settings will

take effect immediately after being saved, making it easy to test various parameters while the conversation is active.

Noise Reduction Level is configured in the web server of the IP station.

- Select **Advanced Configuration > Audio** from the menu



Noise Reduction Levels

- Level 0 means that noise reduction is disabled
- Level 1 gives a maximum noise reduction of 0.2 dB
- Level 2 gives a maximum noise reduction of 6.2 dB
- Level 3 gives a maximum noise reduction of 12.2 dB
- Level 4 gives a maximum noise reduction of 18.3 dB
- Level 5 gives a maximum noise reduction of 24.3 dB
- Level 6 gives a maximum noise reduction of 30.3 dB
- Level 7 gives a maximum noise reduction of 36.3 dB

By default, the noise reduction level is disabled, i.e. set to 0. In very noisy environments, we recommend setting the noise reduction level to 4. At this level, the audio quality is good when quiet, and when noisy, most of the noise is filtered out.

- Set the level required in the **Noise Reduction Level** scroll-down box and click **Save**.

3.2.2 VLAN

VLAN Tagging or IEEE 802.1Q is a networking standard allowing multiple bridged networks to transparently share the same physical network link without leakage of information between networks. IEEE 802.1Q — along with its shortened form *dot1q* — is commonly used to refer to the encapsulation protocol used to implement this mechanism over Ethernet networks.

✎ *STENTOFON IP Stations support 802.1Q as from firmware version 01.09.3.0.*

User interface

VLAN is configured in the IP station web interface.

- Select **Advanced Configuration > VLAN** from the menu

CCoP Station - Switch Enhancement

Apply settings

Enable VLAN: **NO**

Port specific VLAN rules and tagging options

| Port | VLAN ID | VLAN priority | Sending filter | Acceptance filter |
|------------|---------|---------------|----------------|-------------------|
| IP station | 3 | 0 | MEMBERS | ALL |
| LAN | 1 | 0 | MEMBERS | ONLY TAGGED |
| AUX | 2 | 0 | MEMBERS | ONLY TAGGED |

IP station upgrade with VLAN: **NO** (If set yes, then during upgrade station uses IP station VLAN ID to tag/untag packets)

VLAN priority tag to switch priority

| VLAN priority tag | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------|-----|-----|-----|-----|------|------|------|------|
| Switch priority | LOW | LOW | LOW | LOW | HIGH | HIGH | HIGH | HIGH |

Save VLAN settings

Add ports to a VLAN

| Port | Membership | Egress tagging |
|------------|------------|----------------|
| IP station | Not member | Remove tag |
| LAN | Not member | Remove tag |
| AUX | Not member | Remove tag |

VLAN ID:

Add VLAN

Remove VLAN by ID

VLAN ID:

Remove VLAN

VLAN table

| VLAN ID | Membership info | Egress Tagging info |
|---------|----------------------|---------------------|
| 1 | IP station, LAN, AUX | |

Clicking the **Apply settings** button will apply the chosen settings. With the exception of a restart, the saved settings will not come into effect until **Apply settings** is clicked.

Enable VLAN

This option determines whether the switch uses 802.1Q or not. If this is enabled, the switch is VLAN aware. Select **YES** or **NO** from the dropdown menu.

Port specific VLAN rules and tagging options

Here, it is possible to specify which VLAN ID and priority the ports should assign untagged packets to. Tagged packets are not changed.

- **VLAN ID** has a value range from 0 to 4094. It specifies which VLAN ID tag to add to a packet.
- **VLAN priority** has a value range from 0 to 7. It specifies which VLAN priority tag to add to a packet.
- **Sending filter** specifies whether a given port will only send to VLANs which it is a member of or all VLANs. For example, if the chosen option is **MEMBERS** then a packet with VLAN ID 1 at the LAN port will only reach another port which is a member of VLAN ID 1. Select **MEMBERS** or **ALL** from the dropdown menu.
- **Acceptance filter** specifies whether a port will accept only tagged packets or all packets. The option **ONLY TAGGED** should only be used against VLAN aware devices which tag packets. Select **ONLY TAGGED** or **ALL** from the dropdown menu.
- If the **IP-station upgrade with VLAN** scroll-down box is set to **YES** the IP station will send tagged packets during the upgrade.

VLAN priority tag to switch priority

Here, it is possible to specify how the switch should queue the packets with **VLAN priority tag**.

- **Switch priority**: Select **HIGH** or **LOW** from the dropdown menu. By default, packets with VLAN priority tags from 4 to 7 are set to the **HIGH** priority queue.

Add ports to a VLAN

Here, it is possible to determine whether the ports should be members of the specified VLAN. There is also a setting for specifying whether the ports should strip or keep the VLAN tag when sending egress packets.

- **Membership** determines whether the port is a member of the specified VLAN or not. Select **Not member** or **Member** from the dropdown menu.
- **Egress tagging** determines whether the port should remove VLAN tags or keep them for the specified VLAN. Select **Remove tag** or **Keep tag** from the dropdown menu.

Clicking the **Add VLAN** button will add the current chosen settings to the **VLAN table** below. If a VLAN in the **VLAN table** already exists with the chosen **VLAN ID**, then the settings will be updated.

Remove VLAN by ID

Here, it is possible to determine which VLAN is to be removed from the **VLAN table** by specifying the **VLAN ID**, then clicking the **Remove VLAN** button.

VLAN table

The VLANs that the ports are members of are listed under the **Membership Info** column. The table also lists the ports that keep the VLAN tag when sending egress packets; this is shown under the **Egress Tagging Info** column. The **VLAN table** can accommodate a maximum of 63 VLANs.

⚠ *The DHCP address is received before the switch is VLAN aware (during startup). Either trunk all VLANs or set the DHCP server which should reach the IP substation on a native VLAN.*

3.2.3 Network Access Control

IEEE 802.1X is an IEEE Standard for Port-based Network Access Control (PNAC) By “port” we mean a single point of attachment to the LAN infrastructure. It provides an authentication mechanism to devices wishing to attach to a LAN, either establishing a point-to-point connection or preventing it if authentication fails.

⚠ *STENTOFON IP Stations support 802.1X as from firmware version 01.09.3.0.*

User interface

802.1X Network Access Control is configured from the IP station web interface.

- Select **Advanced Configuration > 802.1X** from the menu.



The radio-button list lets the user choose the authentication method to configure and use.

The different authentication methods are:

- MSCHAPV2
- MD5
- TTLS with PAP
- PEAP with MSCHAPV2.

MSCHAPV2 and **MD5** will encrypt the password.

PAP will not encrypt anything.

TTLS with PAP and **PEAP with MSCHAPV2** will encrypt both the **Username** and **Password**.

The parameters to configure depend on the authentication method:

802.1X status: Enable or disable 802.1X.

Username: The user name that identifies a station.

Password: The password associated with the user name.

Fake username: The fake user name sent outside of encrypted tunnel with **TTLS with PAP** and **PEAP with MSCHAPV2**. The user name is encrypted.

If **TTLS with PAP** or **PEAP with MSCHAPV2** is chosen, a certificate must be uploaded to the station by clicking **Browse**. The certificate must either be in Privacy Enhanced Mail (PEM) or Distinguished Encoding Rules (DER) format, and it must be named *certificate.pem*.

- Click **Save** to save the current settings
- Click **Reboot**
 - The new 802.1X settings will only come into effect after the reboot.

4 Software Upgrade

There are two ways of upgrading the software on the IP substation:

- Uploading the software via the webserver of the substation
- Uploading the software via the web interface (AlphaWeb) of the AlphaCom exchange

4.1 Prerequisites

Both upgrade methods require that an TFTP Server is available and that the latest software image file has been downloaded from Zenitel's support website (AlphaWiki). During the upload process, the IP substation will connect to the TFTP Server and download the software. The TFTP Server program must already be installed on your PC. A free TFTP Server program can be downloaded from <http://tftpd32.jounin.net>. Before starting the IP substation upgrade procedure, the TFTP Server program must be running and the folder where the software image file is located must be selected by using the **Browse** button in the program interface.



4.2 Upgrade via Substation Web Server

To upgrade the software from the substation web server:

1. Start the TFTP server and browse to the folder where the software file is located
2. Log on to the IP Substation web server
3. Select **Station Administration > Manual Upgrade**



4. Enter the IP address of the **TFTP server** (your PC IP address)
5. Enter the name of the software **Image file** (include *bin* file extension)
6. Enter the **CRC** checksum (found in the text file from the downloaded software package)
7. Click **Save settings** to store the data

The substation will now try to contact the TFTP server. If the connection cannot be established or the file *tftp_test.txt* is missing from the folder, the message *TFTP_CONN_ERROR* is displayed. If the response is *TFTP_CONN_OK* the settings are saved, and the **Upgrade** button will appear.



Click the **Upgrade** button to upgrade the software of the IP substation. The upgrade procedure takes about 3 minutes.

The transfer process can be monitored by selecting the **Log viewer** tab in the TFTP server program.

4.3 Upgrade via AlphaCom XE

Start the TFTP server and browse to the folder where the software file is located.

Log on to the AlphaCom webserver AlphaWeb.

1. Select **System Upgrade > IP Station Upgrade**
2. Enter the IP address of the **TFTP server**, the filename of the software **Image** and its **CRC** checksum and click **Save**.
3. Select the substation to upgrade and click **Update Station List**.
4. Click **Start Upgrade Process**.

The AlphaCom server/exchange will tell the substation to contact the TFTP server, download the software image and carry out the upgrade. A short status description of the process will be displayed in the Upgrade status column. The message *IPST:ERROR* indicates that there is no connection to the TFTP server, or that the *tftp_test.txt* file is missing from the folder. The transfer process can be monitored by selecting the **Log viewer** tab in the TFTP server program.

- ⚠ *Windows Explorer may be set to hide known file extensions so the file may appear without the **.bin** extension. The name of the software image file has to be entered with the extension **.bin**.*
- ⚠ *During an upgrade, the IP substation switch will not be VLAN aware. Make sure the IP substation can reach the TFTP server from the native VLAN.*
- ⚠ *During an upgrade of the IP substation, 802.1X will not be running. Thus if 802.1X reauthentication is enabled and is performed during the upgrade, the IP substation may lose contact with the TFTP server (depending on the configuration when 802.1X authentication fails). If the IP substation loses contact with the TFTP server, it will not be upgraded.*

A: Substation Board Connections

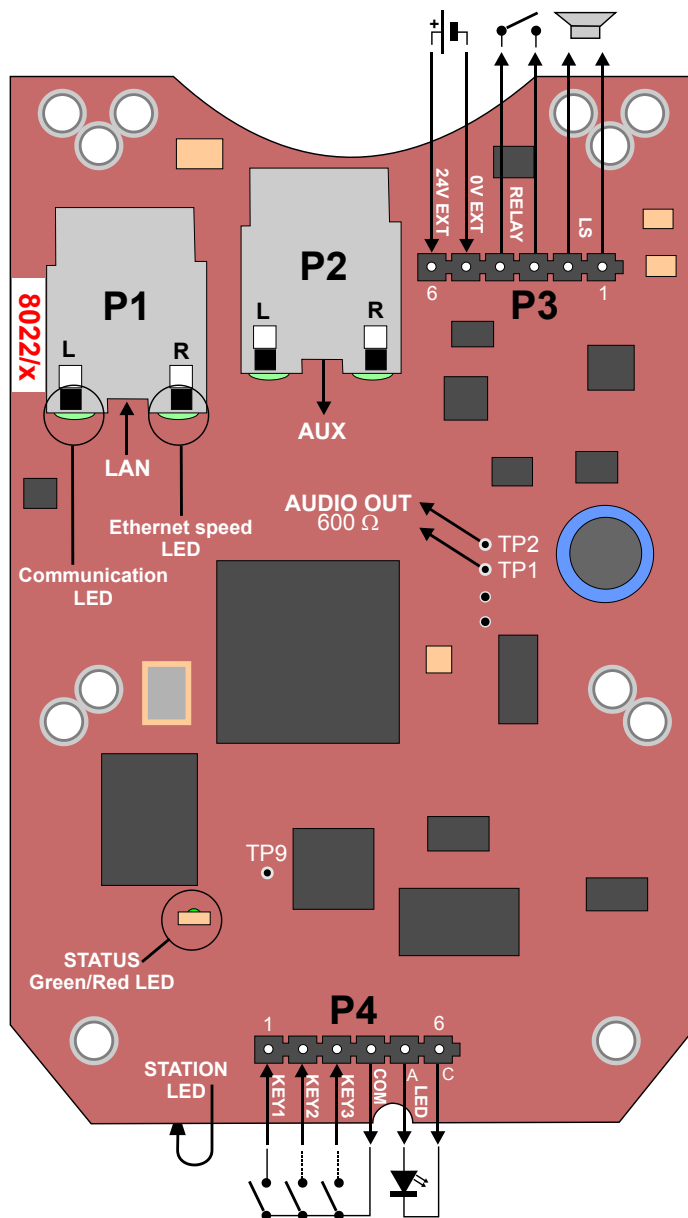


Figure 3 Substation Board Connections

There are four connectors on the IP substation board: P1, P2, P3, and P4.

- P1:** RJ45 LAN connector for 10/100 Mbit Ethernet connection.
The station can be powered from this connection if the line supports Power over Ethernet (PoE).
- P2:** RJ45 connector for auxiliary equipment like IP camera, PC or a second IP station.
This port does not have an individual IP address nor carry power for auxiliary equipment.
- P3:** 6-pin plug-on screw terminal for external connections.
 - Pin 1/2: Connected to station loudspeaker. May also be used for 8-20 ohm / 2W external loudspeaker in parallel.
 - Pin 3/4: Internal NO relay contact for door lock control, etc.

Pin 5/6: Connected to 24 VDC for station power when power is not distributed via LAN. (see *Appendix E: Substation Specifications* for details)
Pin 6 is positive.

P4: 6-pin plug-on screw terminal for internal connections.

Pin 1/4: Call button no. 1

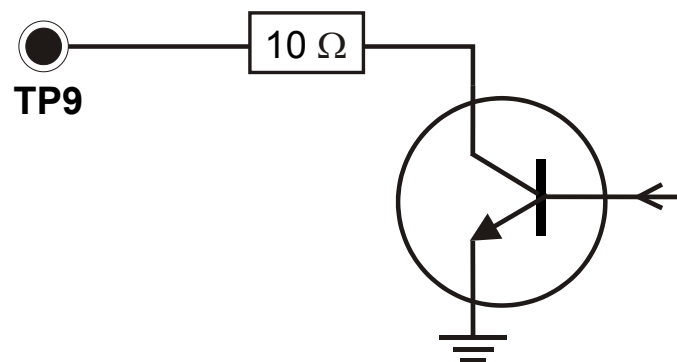
Pin 2/4: Call button no. 2 or logical input

Pin 3/4: Call button no. 3 or logical input

Pin 5/6: Station LED for call and message information

TP1/TP2: 0 dB, 600 ohm balanced audio output for connection to a power amplifier.

TP9: Logical output for a spare relay driver, max. 30 mA.



⚠ Note that the amplifier input **MUST BE AN AC COUPLED INPUT** (transformer, capacitors, etc.).

B: Substation Indication LEDs

B.1 Station LED (on board and front plate)



Blinking at 1 second intervals

- Station has no connection to the AlphaCom server/exchange.

Possible reasons:

- No connection to Ethernet
- Wrong AlphaCom XE IP address configured
- Invalid IP address
- No gateway or wrong gateway to the AlphaCom server/exchange



Blinking at 5 second intervals

- Station connected but NOT registered in the AlphaCom server/exchange.

Reason:

- Station has not been programmed in AlphaPro

No blinking

Possible reasons:

- Station connected and registered to the AlphaCom XE exchange
- Station not powered up (if no other LEDs are active)

B.2 Status LED



Blinking 2 red + 1 green

- Station has no connection to the AlphaCom server/exchange.

Blinking 1 red + 2 green

- Station connected but NOT registered in the AlphaCom server/exchange.

Blinking 3 green

- Station connected and registered in the AlphaCom server/exchange.

B.3 LAN LEDs (on LAN and AUX RJ45 ports)



Left LED

- | | |
|---------------|------------------------|
| Steady light: | Ethernet connection OK |
| Blinking: | Ethernet traffic |
| No light: | No Ethernet connection |

Right LED

- | | |
|-----------|------------------------------|
| Light: | 100 Mbit Ethernet connection |
| No light: | 10 Mbit Ethernet connection |

C: Dimensions & Mounting Instructions

| | Dimensions (WxHxD) | Weight |
|---|--------------------|--------|
| IP Vandal Resistant Substation | 92 x 180 x 46 mm | 0.8 kg |
| IP Vandal Resistant Substation (3 Gang) | 114 x 160 x 60 mm | 0.8 kg |
| Substation Kit | 72 x 110 x 20 mm | 0.1 kg |

Table 2 Substation Dimensions

C.1 IP Substation Dimensions

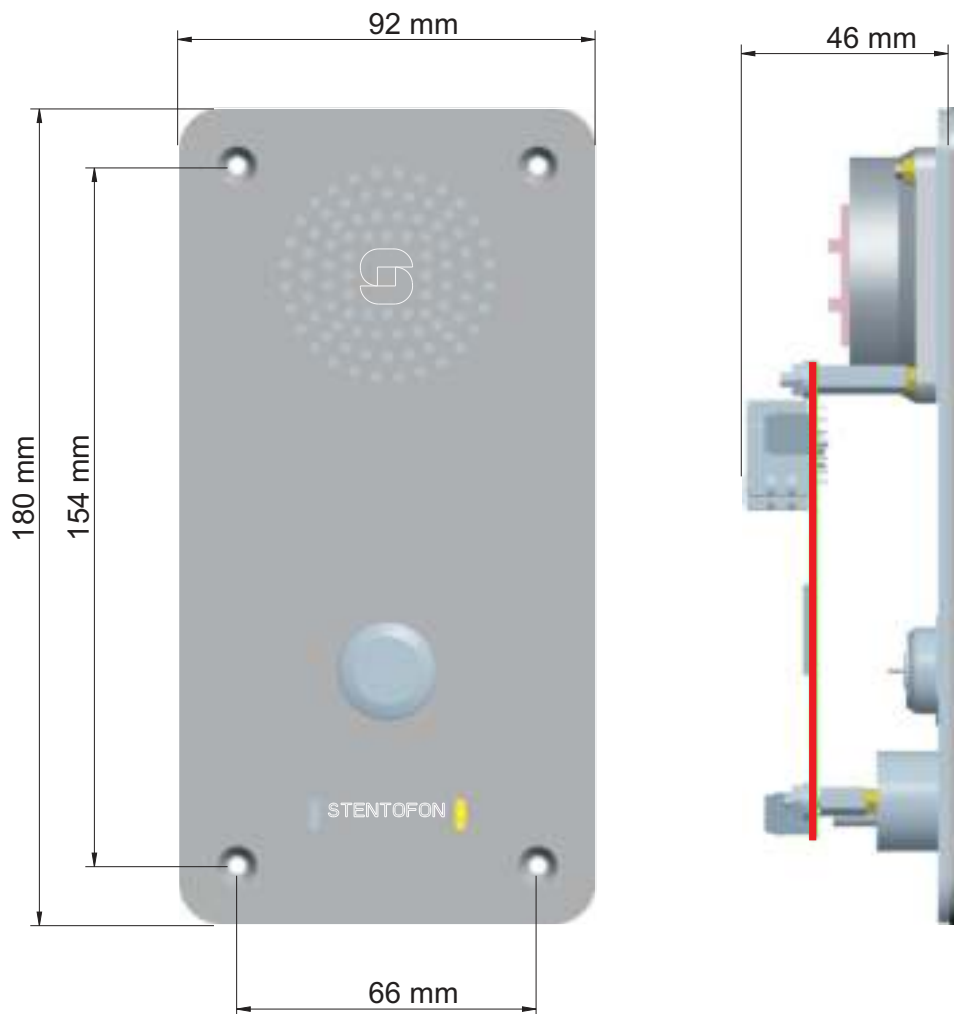


Figure 4 IP Substation Dimensions

C.2 IP Substation Flush Mounting

The IP Vandal Resistant Substation (part no. 1008041100) can be mounted in a flush mount backbox (part no. 1008098100) or a surface mount backbox (part no. 1008098000).

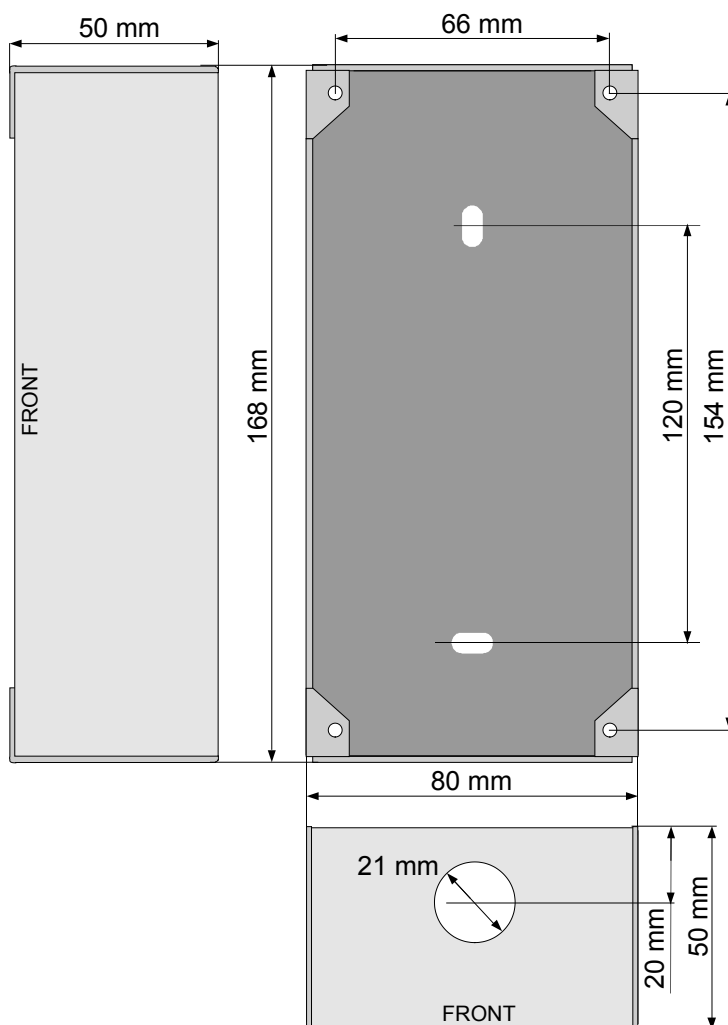


Figure 5 IP Substation - Flush Mount Backbox

C.3 IP Substation Surface Mounting

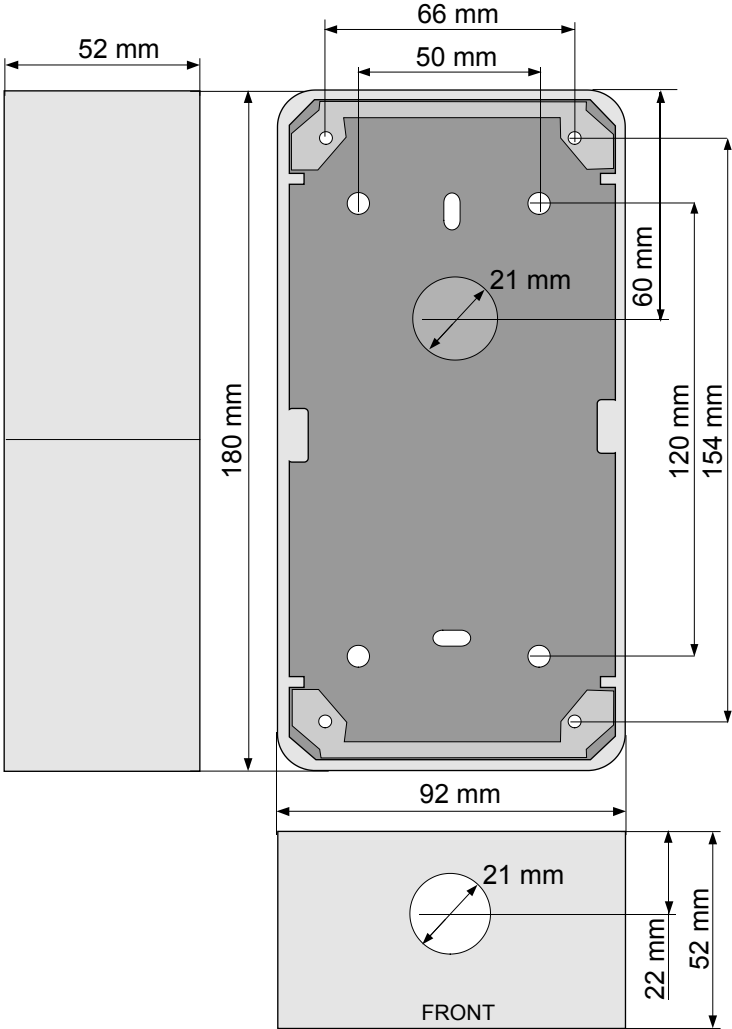


Figure 6 IP Substation - Surface Mount Backbox

C.4 IP Substation (3 Gang) Dimensions

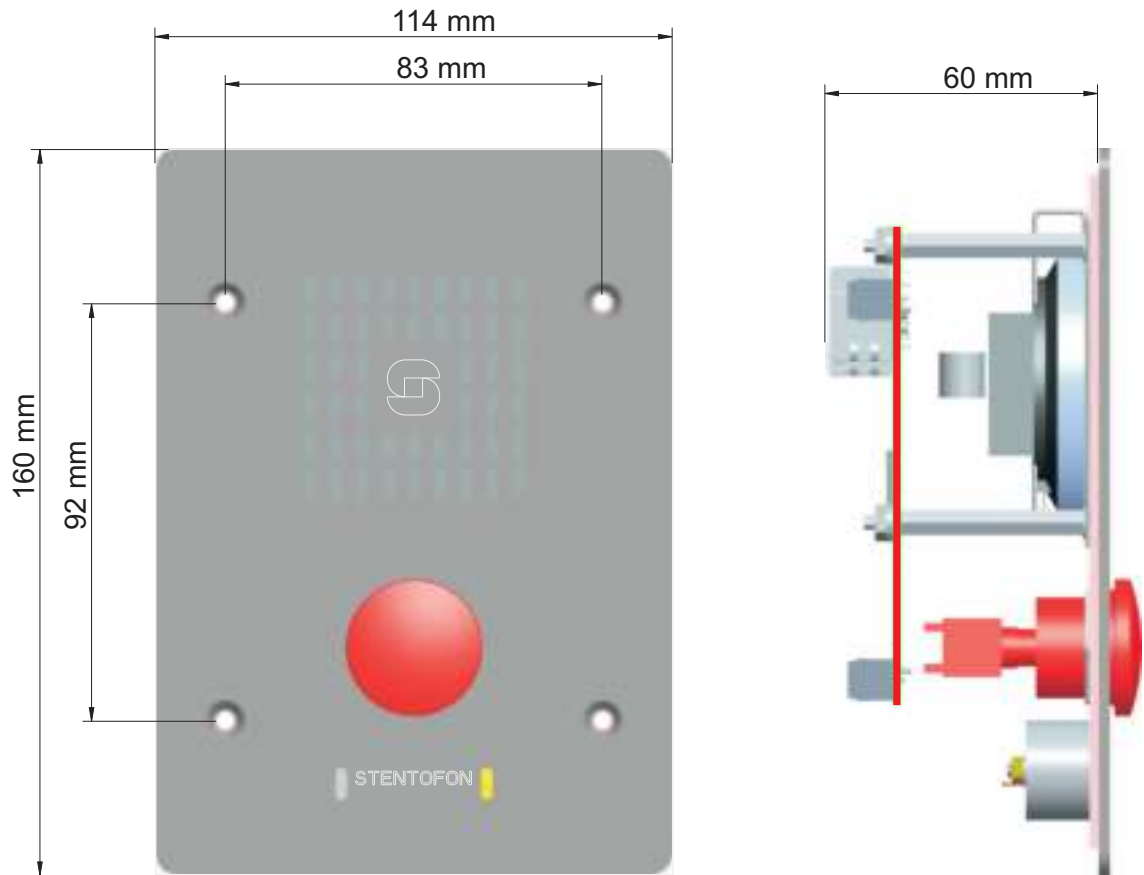


Figure 7 IP Substation (3 Gang) Dimensions

C.5 IP Substation (3 Gang) Flush Mounting

The IP Vandal Resistant Substation (part no.1008051000) is flush mounted in a 3 Gang backbox (part no. 1008098300).

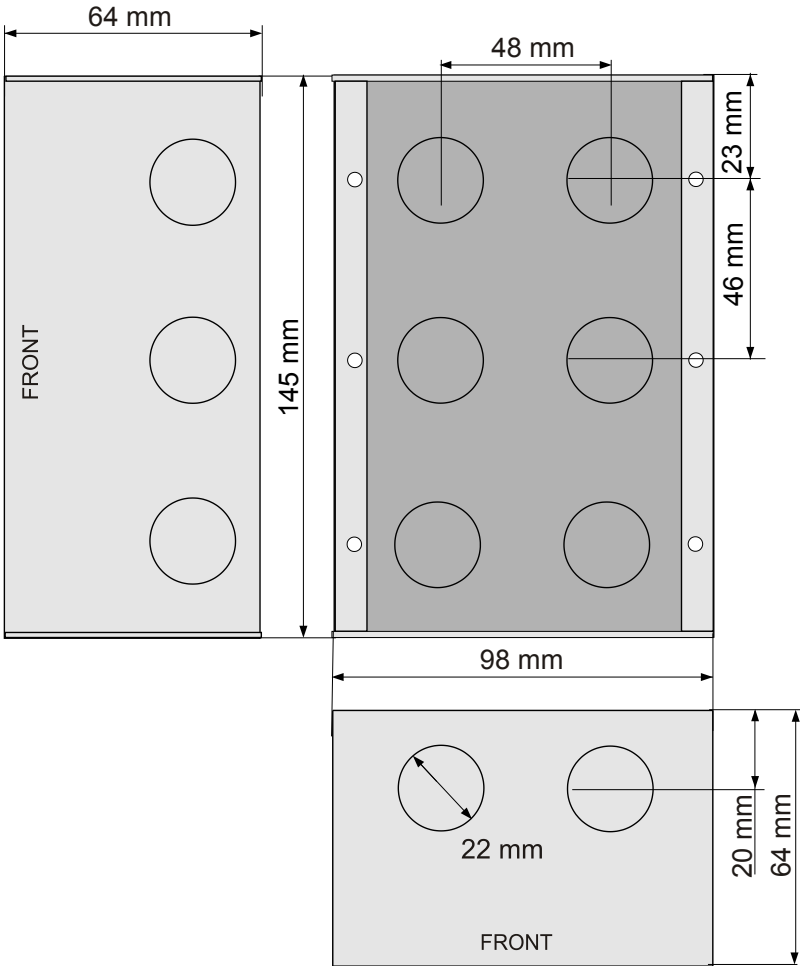


Figure 8 IP Substation - 3 Gang Backbox

C.6 IP Substation Kit Dimensions

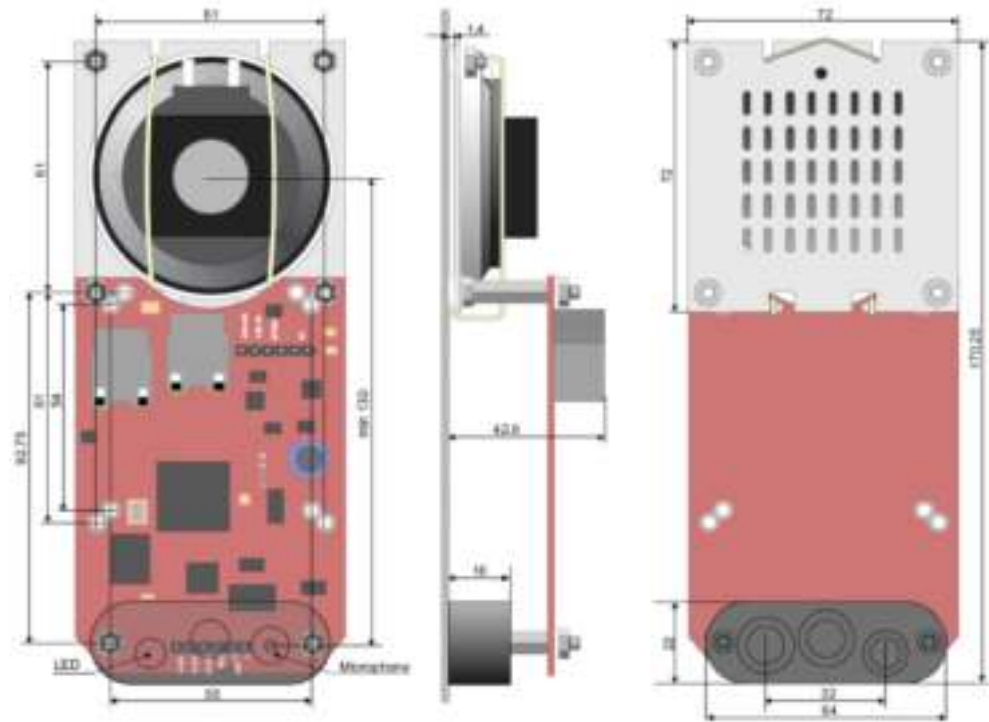


Figure 9 IP Substation Kit Mounting Dimensions (mm)

C.7 Mounting & Assembly Kit for IP Substation

- part no. 1008091000

The mounting and assembly kit includes gaskets, a 2-inch loudspeaker, loudspeaker housing, and microphone with mounting block for call LED.



Figure 10 IP Substation Assembly Kit

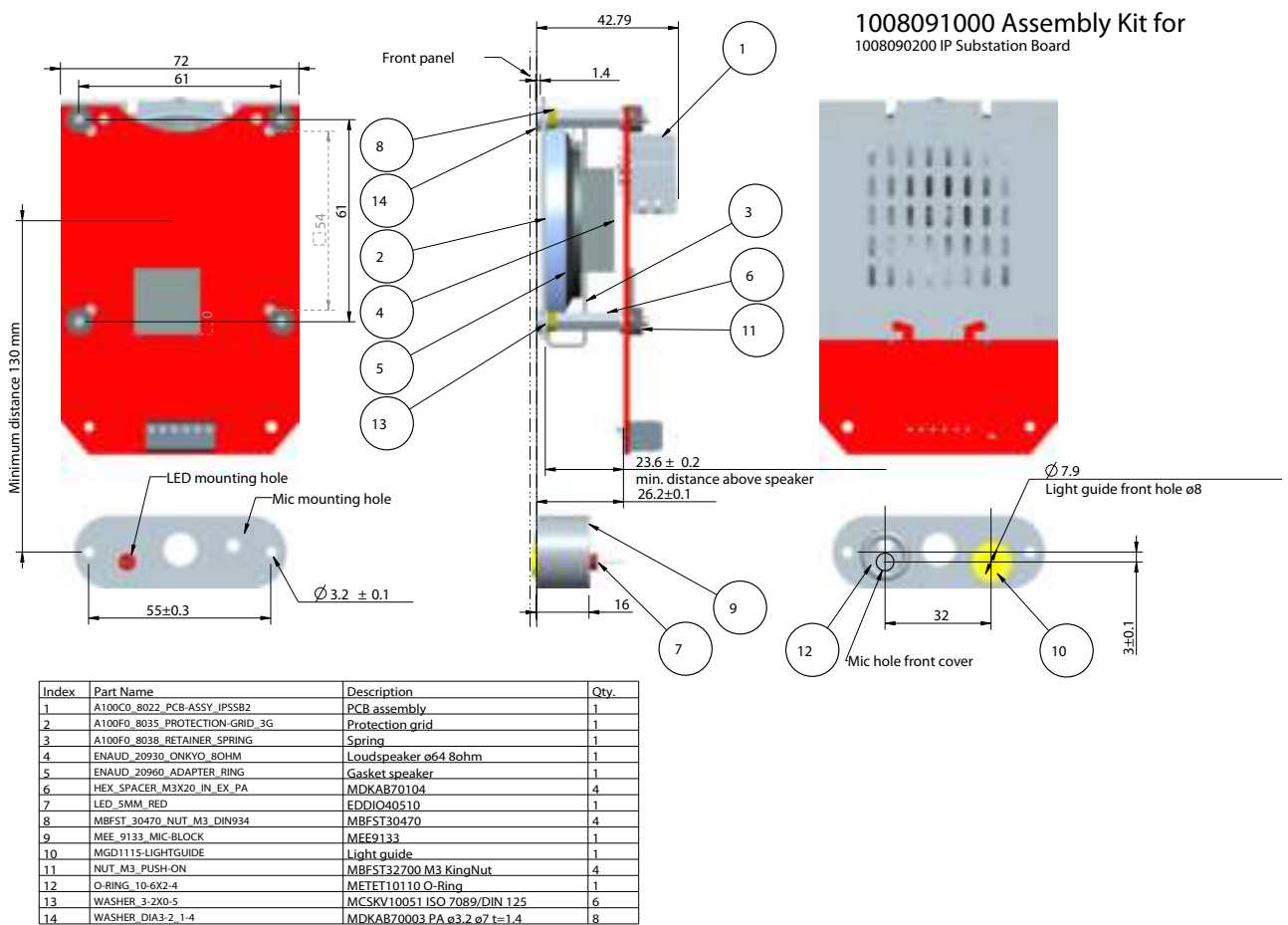


Figure 11 IP Substation Assembly Kit Mounting Dimensions

D: Restoring Factory Defaults

An IP Substation may have to be reset to its original factory default settings if, for instance, the password to the web server is forgotten. The defaults can be either be set to Static IP or Activated DHCP (when there are many new IP Substations in an installation).

D.1 Reset to Factory Default Settings with Static IP



1. While pressing the call button, power up the substation.
2. When the substation LED starts blinking, release the call button **after exactly 1 blink**.
3. Let the LED blink for **exactly 2 more times**, then press the button again.
4. Keep the button pressed until the LED **blinks fast 2 times** indicating a successful reset with static IP.
5. Release the button and the substation will restart with the factory default settings.

Factory default values

Station IP address: **169.254.1.100**

AlphaCom IP address: **169.254.1.5**

Username: **admin**

Password: **alphaadmin**

D.2 Reset to Factory Default Settings with Activated DHCP



1. While pressing the call button, power up the substation.
2. When the substation LED starts blinking, release the call button **after exactly 2 blinks**.
3. Let the LED blink for **exactly 4 more times**, then press the button again.
4. Keep the button pressed until the LED **blinks fast 4 times** indicating a successful reset with activated DHCP.
5. Release the button and the substation will restart with the factory default settings.

Factory default values

Station IP address: (determined by DHCP server)

AlphaCom IP address: **169.254.1.5**

Username: **admin**

Password: **alphaadmin**

E: Substation Specifications

E.1 IP Vandal Resistant Substation

| | |
|--------------------------|---|
| Dimensions (HxWxD) | 180 x 92 x 46 mm |
| Weight | 0.8 kg |
| Protection | Vandal resistant design, 2 mm stainless steel front, tamper proof fastening screws, buttons and loudspeaker grills |
| Protection class | With mounting backbox 1008098000 (surface mount): IP-44 With mounting backbox 1008098100 (flush mount): IP-55 |
| Mounting | Flush mount in 50 mm deep backbox |
| Temperature range | -20°C to +50°C |
| Power | Power over Ethernet: IEEE 802.3 a-f, Class 0 Local power: 19 – 27 VDC, Idle 4W, max. 8W |
| Connectors | 2 x RJ45 (Ethernet) 10/100 Mbps Pluggable screw terminals (audio and I/O) |
| Remote control | 3 digital inputs, 1 relay output and 1 logical output |
| IP protocols | IP v4 - TCP - UDP - HTTPS – TFTP - RTP - RTCP - DHCP - SNMP - DiffServ - TOS – STENTOFON CCoIP® |
| LAN protocols | Power over Ethernet (IEEE 802.3 a-f), VLAN (IEEE 802.1pq), Network Access Control (IEEE 802.1x), STP (IEEE 802.1d), RSTP (IEEE 802.1d-2004) |
| Audio technology | Wideband 200 Hz - 7 kHz (G.722) Telephony 3.4kHz (G.711) Active noise filtering Acoustic echo cancellation Open duplex Adaptive jitter filter 1.5 Watt audio output 8 ohm loudspeaker impedance External audio out (0dB, 600 ohm) |
| Management and operation | HTTPS (Web configuration) DHCP and static IP Remote automatic software upgrade Centralized monitoring Status LED |
| Advanced features | Dual port managed data switch supporting VLAN and network access control |

E.2 IP Vandal Resistant Substation (3 Gang)

| | |
|--------------------------|---|
| Dimensions (HxWxD) | 160 x 114 x 60 mm |
| Weight | 0.8 kg |
| Protection | Vandal resistant design, 2 mm stainless steel front, tamper proof fastening screws, buttons and loudspeaker grills |
| Protection class | With mounting backbox 1008098300: IP-65 |
| Mounting | Flush mount in 3 Gang backbox, 3 1/2 inch deep |
| Temperature range | -20°C to +50°C |
| Power | Power over Ethernet: IEEE 802.3 a-f, Class 0 Local power: 19-27 VDC, Idle 4W, max. 8W |
| Connectors | 2 x RJ45 (Ethernet) 10/100 Mbps Pluggable screw terminals (audio and I/O) |
| Remote control | 3 digital inputs, 1 relay output and 1 logical output |
| IP protocols | IP v4 - TCP - UDP - HTTPS – TFTP - RTP - RTCP - DHCP - SNMP - DiffServ - TOS – STENTOFON CCoIP® |
| LAN protocols | Power over Ethernet (IEEE 802.3 a-f), VLAN (IEEE 802.1pq), Network Access Control (IEEE 802.1x), STP (IEEE 802.1d), RSTP (IEEE 802.1d-2004) |
| Audio technology | Wideband 200 Hz - 7 kHz (G.722) Telephony 3.4kHz (G.711) Active noise filtering Acoustic echo cancellation Open duplex Adaptive jitter filter 1.5 Watt audio output 8 ohm loudspeaker impedance External audio out (0dB, 600 ohm) |
| Management and operation | HTTPS (Web configuration) DHCP and static IP Remote automatic software upgrade Centralized monitoring Status LED |
| Advanced features | Dual port managed data switch supporting VLAN and network access control |

E.3 IP Substation Kit

| | |
|--------------------------|---|
| Dimensions (HxWxD) | 110 x 72 x 20 mm (PCB) |
| Weight | 0.1 kg |
| Call buttons | Connection for 3 NO contacts |
| Mounting | Inside custom made stations |
| Temperature range | -20°C to +50°C |
| Power | Power over Ethernet: IEEE 802.3 a-f, Class 0 Local power: 19 – 27 VDC, Idle 4W, max. 8W |
| Connectors | 2 x RJ45 (Ethernet) 10/100 Mbps Pluggable screw terminals (audio and I/O) |
| Remote control | 3 digital inputs, 1 relay output and 1 logical output |
| IP protocols | IP v4 - TCP - UDP - HTTPS – TFTP - RTP - RTCP - DHCP - SNMP - DiffServ - TOS – STENTOFON CCoIP® |
| LAN protocols | Power over Ethernet (IEEE 802.3 a-f), VLAN (IEEE 802.1pq), Network Access Control (IEEE 802.1x), STP (IEEE 802.1d), RSTP (IEEE 802.1d-2004) |
| Audio technology | Wideband 200 Hz - 7 kHz (G.722) Telephony 3.4kHz (G.711) Acoustic echo cancellation Open duplex Adaptive jitter filter 1.5 Watt audio output 8 ohm loudspeaker impedance External audio output (0 dB, 600 ohm) |
| Management and operation | HTTPS (Web configuration) DHCP and static IP Remote automatic software upgrade Centralized monitoring Status LED |
| Advanced features | Dual port managed data switch supporting VLAN and network access control |

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