arcutronix

@ccess the Ethernet

USER GUIDE

SHX

arcutronix GmbH Deutschland

Installation and Operation Manual

Version 1.4

SHX - System Housing

USER GUIDE

Covered Variants of SHX by this User Guide:

SHX3-7W (obsolete):	0717 - 9001
SHX3-10W:	0717 - 9401
SHX3-10W-RF:	0717 - 9411
SHX3-15W:	0717 - 9101
SHX6-15W:	0717 - 9201
SHX3-10W:	0717 - 9401
SHX3+1:	0717 - 9301

Part-Number (User-Guide):	0717 90 65
Version:	V 1.4
Date of Issue:	2013-04-17

Contacts

arcutronix GmbH
Garbsener Landstraße 10
D-30419 Hannover, Germany
Tel.: +49 (0)511 277- 2700
Fax: +49 (0)511 277- 2709
E-Mail: info@arcutronix.com
http://www.arcutronix.com

Copyright Note

Document Contents

This document contains the latest information available at the time of publication. The content of this document is subject to change without prior notice. arcutronix reserves the right to modify the content at any time. arcutronix shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. To request arcutronix publications or comment on this publication, contact a arcutronix representative or the arcutronix corporate headquarters. arcutronix may, without obligation, use or distribute information contained in comments it receives. Address correspondence to the attention of Manager, Technical Publications.

Trademarks

arcutronix is a registered trademark of arcutronix GmbH. All other products, trade names and services are trademarks, registered trademarks or service marks of their respective owners.

About this Book

Document Organization

This user guide describes the hardware components and usage of the SHX - System Housing. It provides information on configuration, system installation and the technical data. Also, it provides the procedures to operate and/or test the components of these devices.

The intended audience of this document is anyone who is responsible for installing, maintaining or operating the SHX. This person must be aware of the risks, affected with these actions and must be qualified and trained. **Observe the safety precautions described in section "Precautions for transporting, installing and operating the device" and "Power Precautions".**

The manual is designed as printable book, therefore chapters start at odd pages (the last even page of the chapter before may be blank). The headlines of the pages contain chapter name, chapter count, and chapter headline. The foot lines of the pages contain chapter page count, the revision date and the document title. Font attributes are used to identify single words or chapters with a certain content.

The information in this manual is divided in several object orientated universal chapters. View and compare to your device to find the individual information: take the information that fits. Ignore the information, which is not relevant in the current case.

Chapters

Chapter 0**, Safety, Instructions, Statements:** Handling, precautions, warnings.

Chapter 1**, Introduction:** Provides a general description of the SHX family, lists the components and its functions.

Chapter 2**, Getting Started:** Short form about installation, mounting and configuration of SHX-family.

Chapter 3**, Hardware:** Lists the components and its functions of SHX family.

Appendix A**, Technical Information:** Shows the technical data and order information.

Appendix drill**, Drilling Template:** For all SHX-variants.

Appendix EC**, EC Conformity Declaration:** For all SHX - System Housing products.

Release History

2008-03-13   First issue of the SHX User Guide.

2008-09-11   Changes:

- Switchable front plate added.
- Change of fuse added.

2009-02-16   Changes:

- Added SHX3-15W and SHX6-15W.
- DC-Input range more exactly specified: 48...72VDC (+20%, -10%).
- Drilling Template SHX6 added.

2009-11-06   Added:

- AC- and DC-cable requirements.
- IP-classification for all SHX-variants.

Changes:

- New front page and last page added.

2009-11-25   Added:

- SHX3+1: New 2-slot housing, based on SHX6.

2010-01-07   Added:

- SHX3-10W: New 1-slot housing, for max. 10W power dissipation.

2013-04-17   Added and changed the following topics:

- SHX3-10W-RF added.

Table of Contents

Chapter 2   Getting Started

Chapter 3   Hardware

Appendix A   Technical Information

Appendix drill   Drilling Template

Appendix EC   EC Conformity Declaration

List of Tables

List of Figures

Chapter 0
Safety, Instructions, Statements

Safety Precautions

The following sections provide the safety precautions for the supplied device. You must always observe the power precautions for the device. You must follow all warning notes to ensure that the procedures are performed safely. You must follow all caution notes to ensure that the device is operated correctly.

WARNING: Serious injury or loss of life is possible, if instructions are not carried out.

CAUTION: Serious damage or destruction is possible, if instructions are not followed.

NOTE: Before installing the device find out if any local technical rules must be observed. These may be defined by ANSI, ITU-T, IEC, your PTT, or other similar organizations.

Power Precautions

WARNING:

DANGER

- Disconnect the power cord before opening the device.

- Always plug the power cords into properly grounded receptacles. An improperly wired receptacle could place hazardous voltage on the accessible metal parts of the device.

- Use only approved power cords.

- Use only manufacturer supplied power supplies.

- The power supply must match the power specifications for the device.

- Do not work on the equipment during periods of lightning activity.

Handling Precautions

Note: Precautions for transporting, installing, and operating the device:

- Avoid excessive shocks and vibrations. Install shock absorbers, if you need to use the device for mobile applications.

- Avoid contact with any liquid (e.g. water) or dust or dirt.

- Avoid exposing the device to excessive direct sunlight.

- Ensure sufficient cooling of the device.

- Prevent loose items from falling into the device.

- Avoid damage to components when installing or setting switches or jumpers of the device.

- Always place protective covers on all fiber optic cables and connectors that are not in use to prevent breakage and contamination.

- Inspect all fiber optic connections and clean contaminated surfaces before use.

- Attach a wrist strap and follow ESD procedures, see next paragraph.

Preventing Damage From Electrostatic Discharge

CAUTION: Discharge of static electricity (ESD) can damage or degrade electronic components. The electrostatic potential of a person can be several thousand Volt and a discharge to semiconductor components may have severe consequences. Observe the precautions below when you are handling any hardware with electronic components.

Card Protection

Each card is shipped in a separate, reusable, and anti-static shielding bag. Leave each card in its bag until you are ready to install it into the system. Do not remove the card from its bag unless you are grounded. Do not place a bag on exposed contacts where it can cause short circuits.

Grounding Procedure

Before attempting to install or remove any part of the chassis, ensure that you, the equipment chassis, and the rack mount cards are at ground potential to prevent electro-static discharge (ESD). Electrostatic discharges can damage the components of the system. To place yourself at ground potential, connect the chassis with a ground wire or via the power cord with a grounded mains socket and clip your wrist strap to the chas-sis.

The following advice will help you to prevent ESD damage to electrical components:

- Always use an ESD wrist strap with a metal clip for grounding.

- Limit your movement as much as possible. Movement can cause a build-up of static electricity.

- Handle the system and its components carefully. Never touch the circuitry. Place your hands only on the edges, rails, or frame of the unit.

- Touch a spare component - while it is still in the anti-static wrapping - to an unpainted metal portion of the chassis for at least two seconds. This allows the static electricity to discharge harmlessly from your body and the spare.

- Install the spare directly into the chassis after removing it from the anti-static wrapping. Do not remove the anti-static wrapping until you are ready to do the install. If you must set down an unwrapped spare, set it down on an anti-static mat or on its anti-static wrapping.

Caution: Do not place the spare component on the top of the chassis, rack, or on a metal table. Either action could cause severe damage to the spare.

- Set down cards with their component sides face up.

- Be aware of weather conditions. Cold weather increases the likelihood of static electricity build-up.

- Be aware of your own conductivity level. Wear ESD shoes to diminish personal static electricity build-up. Wear e.g. an electrostatic dissipative lab coat.

Fiber Optic Precautions

Caution: An optical fiber may carry (invisible) light from the remote system.

This device may contain Laser Class 1 components, like laser transmitters or light emitting diodes LED (refer to technical data). Operating components emits (invisible) laser radiation. Be careful when you are working with these components. The following safety precautions must be followed when working with fiber optics and Laser Class 1 components:

WARNING: Do not look into the fiber optic output. Looking into the fiber optic output can cause injury to the eye. When observation is necessary eye protection must be worn and precautions must be taken to avoid exceeding the limits recommended in ANSI Z136.1-1981.

WARNING: Use caution when working with the laser components of the device. The device is designed to protect the user against optical powers beyond laser class 1.

WARNING: Ensure that the incoming signal from the remote device does not exceed the power defined for laser class 1 when the cabling is disconnected. The device will also become unsafe, if any unsafe equipment is connected to the system.

WARNING: Do not disconnect the fiber optic cables while power is applied. Disconnecting the fiber optic cables could expose the user to optical powers beyond laser class 1.

Caution: Use Of Controls Or Adjustments Or Performance Of Procedures Other Than Those Specified Herein May Result In Hazardous Laser Light Exposure.

CAUTION Laser Class 1. Complies with FDA radiation standards, 21CFR subcategory J. DANGER (Invisible) laser radiation when open and / or interlock defeated. Avoid direct exposure to beam!

Technical Instructions to User

Do not use this product for other applications than suggested in this manual!

The international standards and the technical rules of your local PTT company must be observed.

All interface cables to this equipment must be shielded and designed in accordance with proper EMI techniques to ensure compliance with EMC requirements. arcutronix will provide cable shielding specifications on request.

Inspection

Before commissioning, check the content of the consignment for completeness and note whether any damage has occurred during transport. If so, do not use the parts and contact your arcutronix representative.

Commissioning

Work may be carried out only by qualified personnel. The relevant precautions must be taken.

Cleaning

To clean the outer surfaces, use a soft damp (not wet) cloth. Do not let moisture go inside. Please consider the properties of the housing and other material used!

Table 0-1 Effects of Cleaning Liquids

Valuation	ABS/ABS+PC/PC/PPE+PS
well resistant	water, aqueous saline solutions, sud, diluted acid and alkali
conditionally resistant	alcohol, aliphatics, oil and fat
not resistant	concentrated mineral acid, aromatic and halogenated hydrocarbon, ester, ether, ketone

Quality

The quality management of arcutronix is certified to DIN ISO 9001:2000.

This product is manufactured to the arcutronix quality standards.

Repair

There are no repairable parts in the device. Defective parts must be sent to arcutronix GmbH for repair. The power supplies of a device may contain fuses. Blown-up mains fuses must be replaced by fuses of the same type and the same ratings. Using repaired fuses or short-circuit the fuse holder are not permitted.

Disposal and Recycling

This symbol on the product or on the packaging indicates that it is can be recycled. To save our environment please hand it over to your next recycling point.

This symbol on the product or on its packaging indicates that it shall not be treated as household waste. Instead it shall be handled over to the applicable collection point for the recycling of electronic equipment.

For more detailed information about recycling contact your local city office, your waste disposal service or where you purchased the product.

CE Conformity

arcutronix products complies with the European standard regulation. They are tested to the Council guideline for harmonizing the legal regulations of the member states on electromagnetic compatibility.Electromagnetic Immunity Statement

Electromagnetic Immunity Statement

This equipment has been tested and found to comply with the limits of EN 50082-2 (Electromagnetic Immunity for heavy industry).

Instructions to User

All interface cables to this equipment must be shielded and designed in accordance with proper EMI techniques to ensure compliance with EMC requirements. arcutronix will provide cable shielding specifications on request.

Electromagnetic Emissions Statements

To achieve satisfactory EMC performance, all interface cables to this equipment must be shielded and designed in accordance with proper EMI techniques. Rack mount cards has to be inserted into the designated chassis. Chassis slots that are not used have to be covered with a blanking plate. The chassis must be bonded to earth. This is usually achieved by installing the power cord to the chassis. An extra earth terminal may be provided. If this device is used in a residential setting, resulting interference must be corrected by the user. Any user modification made to the unit voids the user's authority to operate the unit under the FCC rules.

This is a Class A product. In a domestic environment, this product may cause interference in which case the user may be required to take adequate measure. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*United States Federal Communications Commission (FCC) Electromagnetic Emissions Statement*

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions in this manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference in which case the user at his own expense will be required to take whatever measures may be required to correct interference.

Canadian Department of Communications (DOC) Statement

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions in this manual, may cause interference to radio communications. This digital apparatus has been tested and does not exceed the Class A limits for radio noise for digital apparatus set out in the DOC Radio Interference Regulations. The regulations are designed to provide reasonable protection against radio noise interference in which case the user at his own expense will be required to take whatever measures may be required to correct interference.

European Communities

WARNING: This equipment has been tested and found to comply with the limits of CISPR 22 and EN 55022 Class A for information technology equipment. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Unpacking the Unit

Before commissioning, check the content of the consignment for completeness and note whether any damage has occurred during transport. If so, do not use the parts and contact your local arcutronix representative.

Precautions for transporting, installing and operating the device

- Avoid excessive shocks and vibrations.Install shock absorbers, if you need to use the device for mobile applications.

- Avoid contact with any liquid (e.g. water), dust or dirt.

- Avoid exposing the device to excessive direct sunlight.

- Ensure sufficient cooling of the device.

- Prevent loose items from falling into the device.

Avoid damage to components when installing or setting switches or jumpers.

Abstract

SHX Description

General

The SHX is a family of card housings, which allows to use all arcutronix's rack mount cards as standalone units. Most members of the family are single-slot housing. The SHX3+1 is a dual-slot housing, with limited features on the "+1" (= one additional) slot. All members of the family can be placed as desk-top application, wall-mounted or in a 19"-shelf (together with a special bearer-plate). A flexible front adaptor allows to use the SHX-family with lots of different product groups and families. Together with a multi voltage power supply unit, which allows AC, DC or Remote [1] feeding, the SHX is the most flexible stand-alone chassis.

The SHX housings offer in addition a VT100 (RS232) serial interface, for configuration and local supervision of the installed transport device. Initial setup and changes of factory defaults can be done as well as switching loops and other diagnostics for local checks. In normal operation, the devices plugged in a SHX will be managed from remote via inband line management capability, but a local access is sometimes nevertheless required. In case of P2P application with both devices installed in a SHX, one can reach the far-end unit via the local VT100 access and remote management capability, as well.

An alarm-output completes the unique feature-set of the SHX. This outlet can trigger a buzzer or any other alarm system and is galvanic detached by the use of a relay.

The SHX can be supplied with AC as well as DC power. 110VAC to 230VAC or 48VDC to 60VDC can be used to accommodate the stand-alone unit without any change in configuration or power cable. The SHX-RF (="Remote Feeding") variants are able to use a third way of operation: Remote Feeding can be used, which is carry along the (copper) line of the plugged linecard (e.g. CSX4-RF).

Some of the housings are equipped with an additional ventilation system to make sure the environmental condition within the housing will not exceed the allowed ranges and the temperature will not be too high. This is necessary to prevent the devices from damaging.

---

1. Only SHX3-10W-RF is capable for remote feeding.

Application Areas for SHX

SHX3 and SHX6

SHX3 and SHX6 are the elemental remote housings for arcutronix high density rack SRX. It is placed on the edge of access network to shelter arcutronix' connectivity products as well as Ethernet demarcation devices. One housing for all applications, this makes the SHX so unique.
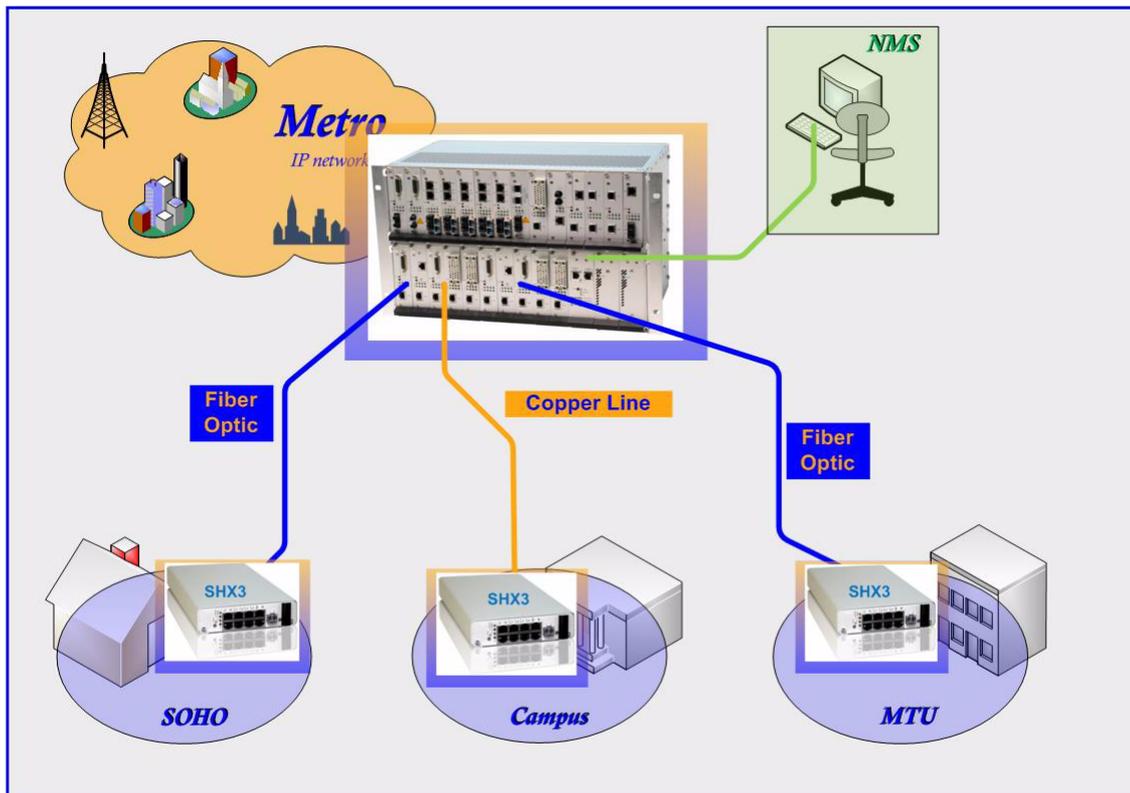

Figure 1-1 *SHX application example*

SHX3+1

SHX3+1 is a dual slot housing with limited capabilities on the right slot. In the right slot no management or alarm connector is available. It is mainly made to house two line-cards for special applications.

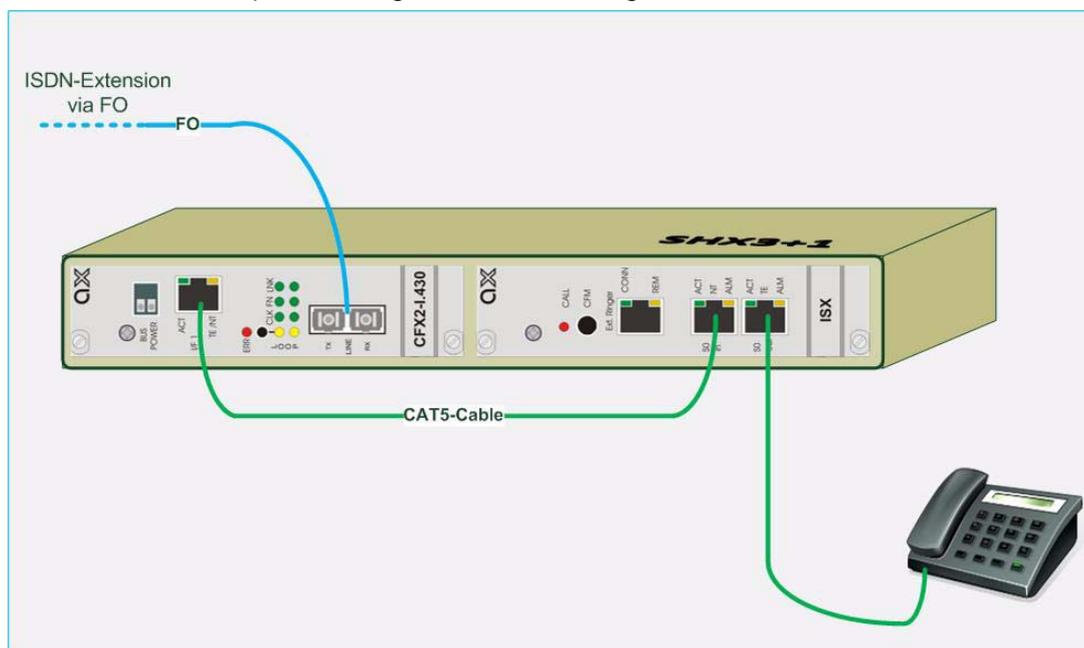As an example, the usage of CFX2-I.430 together with ISDN-Sniffer ISX.

Figure 1-2 *SHX3+1 application example*

SHX3-RF

SHX3-RF is a single-slot housing, which can use the remote power feeding coming from a central office place.

Remote feeding is a technology which enables operators to power remote sites from a central location by delivering that power via twisted pair cable. Remote feeding is by far the most cost effective solution for powering remote sites and gives the service provider independence from any local power at the CPE location.

The SHX-RF (Remote Feeding) family supports this feature in cooperation with the "Feeding Unit" SRX10-RF and the "Feeded Housing" SHX3-10W-RF. The SRX10-RF is usually installed in an CO environment. It can house 10x SHX-RF and can feed via TP 10x SHX-RF (in SHX3-10W-RF).

The arcutronix remote feeding implementation offers many additional benefits to operators and service providers:

- Safety

Deploying our system provides the safest powering solution for active equipment installed in street-side locations. Indeed in the event of any failure of the system the power source is shut down rendering the installation harmless to people.

- Size

With its original design arcutronix offers a highly compact solution to powering equipment in street cabinets.

- Very high reliability without remote batteries
- Ease of planning

A major advantage for operators is the ease with which the system can be deployed.
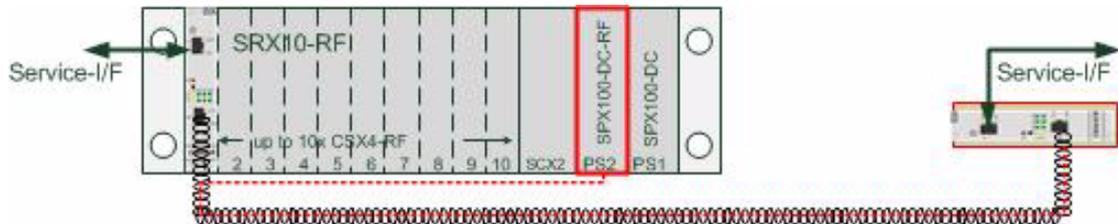

Figure 1-3 *SHX-RF application with Remote feeding via CSX4-RF*

SHX Functions at a Glance

- Cage for arcutronix' 3RU or 6RU rack mount cards
- VT100 management port via D-SUB9 connector
- Alarm contact
- Optional ventilation unit with fan
- Integrated wide range power supply:
- 48VDC …110/230 VAC
- Compact design
- Ready for Wall-mount installation

Order Matrix

This order matrix shows the available variants of SHX - System Housing. Further options are available on request.

Table 1-1 *Order Matrix*

Art.- No.	Short Name	Description
0717-9001 (obsolete!)	SHX3-7W	Stand-alone housing: • 1 slot for 3RU line-card; • VT100 Management port (D-Sub9); • with alarm contacts, grounding bolt; • integrated wide range power supply; • mains supply: 48VDC…110/230VAC.
0717-9101	SHX3-15W	Stand-alone housing: • 1 slot for 3RU line-card; • max. 15W power consumption; • VT100 Management port (D-Sub9); • with alarm contacts, grounding bolt; • active ventilation inside; • integrated wide range power supply; • mains supply: 48VDC…110/230VAC.
0717-9102	SHX6-15W	Stand-alone housing: • 1 slot for 6RU line-card; • max. 15W power consumption; • VT100 Management port (D-Sub9); • with alarm contacts, grounding bolt, ventilation; • integrated wide range power supply; • mains supply: 48VDC…110/230VAC.
0717-9301	SHX3+1	Stand-alone housing: • 2x slot for 3RU line-card; • max. 15W total power consumption; • VT100 Management port (D-Sub); • with alarm contacts, grounding bolt, ventilation; • integrated wide range power supply; • mains supply: 48VDC…110/230VAC.

Table 1-1 *Order Matrix*

Art.- No.	Short Name	Description
0717-9401	SHX3-10W	Stand-alone housing: • 1 slot for 3RU line-card; • max. 10W power consumption; • VT100 Management port (D-Sub9); • with alarm contacts, grounding bolt; • no active ventilation inside; • integrated wide range power supply; • mains supply: 48VDC…110/230VAC.
0717-9411	SHX3-10W-RF	Stand-alone housing: • 1 slot for 3RU line-card; • max. 10W power consumption; • VT100 Management port (D-Sub9); • with alarm contacts, grounding bolt; • no active ventilation inside; • integrated wide range power supply; • Remote feeding supported; • mains supply: 48VDC…110/230VAC.

Accessories

Cables

Table 1-2 *Accessories (Cables)*

Art.- No.	Short Name	Description
0500-001	PC-E	Power cord, European plug.
0500-002	PC-B	Power cord, Great Britain plug.
9500-0101	DCX-DB9M - DB9F	Digital Cable: • D-Sub9 male to D-Sub9 female; • used for VT100-Management via an RS232 (D-Sub9 conn.) interface.

NOTE: All order matrices will be regularly updated. Asked your arcutronix representative for the latest publications.

Chapter 2
Getting Started

For the startup of the SHX-xx please follow the directions in this chapter.
You must keep the operating conditions specified for the devices. In the following read about the startup preparation, the startup itself, and the possibility to automate the startup.

WARNING: Read the safety notes at the beginning of this manual carefully before you start the device!

Delivered Parts

Please check if all the items listed below are included in your delivery.
Your delivery includes:

- An SHX-xx system
    - including an IEC connector for DC- (or AC-) power cable.
    - including wall-mounting set (2x screws, 2x anchors and drilling template).
- optional: Power cord for AC
- optional: Line-card already installed into SHX.
    - For this line-card an additional manual is valid. Please get it from the download area of arcutronix.

Preparing the Startup

Before you switch on the device you need to check the operating conditions and install the SHX-xx on a proper location.

Operating Conditions

Read the operating conditions specified in this section carefully to avoid damages to the device or connected systems.

Ambient Conditions

The ambient conditions, which must be maintained for the SHX-xx, are shown in Table A-1.

CAUTION: If operating limits are exceeded, malfunctions and permanent damage to the equipment may result.

NOTE: In order to operate the various interfaces, please ensure that the plugs are firmly engaged in the sockets.

Preparing SHX

The SHX has a very flexible housing concept being prepared for all "standard" and "classic" line-cards of company arcutronix as well as Pandatel and some others. arcutronix' "classic" line-cards are the 1st generation with less space on the bottom side of the PCBA, while the "standard" line-cards (or 2nd generation) offers the possibility to have higher density and assembled parts on the bottom side.

To fit the SHX for two different mechanical forms of line-cards, a switching plate is given, which can be fixed in a matching position. Please see "Chapter 3, Power Provisioning" and "Chapter 3, Switching the Adaptor-Plate" for details about the plate and the proper position. If the plate must be changed, do this before installing the SHX at the final location.

SHX-xx Mounting

To mount the SHX-xx in the final location please follow the subsequent step-by-step instructions.

Desktop

1. Disconnect all cables from the SHX-xx before mounting the device.

2. Place the SHX-xx right way up on a table with the front panel looking in your direction.

3. Connect the power cable to the SHX-xx.

   – In case of SHX-RF, no external power cable is needed.

4. Check the green LED on the rear side of the SHX-xx, it must lit, when power is available.

   – In case of SHX-RF, the green LED will lit, as sson as remote power is available. This requires a "RF-Linecard" (e.g. CSX4-RF) and adjustant equipment on the CO side.

Wall-Mounted

1. Disconnect all cables from the SHX-xx before mounting the device.

2. Use the "Drilling Template" on page drill-1 to fix the screws of the wall-mounting set.

3. Place the SHX-xx either "face down" or "face left" onto the screws.

4. Connect the power cable to the SHX-xx.

   – In case of SHX-RF, no external power cable is needed.

5. Check the green LED on the rear side of the SHX-xx, it must lit, when power is available.

   – In case of SHX-RF, the green LED will lit, as sson as remote power is available. This requires a "RF-Linecard" (e.g. CSX4-RF) and adjustant equipment on the CO side.

Chapter 3
Hardware & Interfaces

In this chapter beside a list of system views you will find a description of the function indicators and external interfaces for the SHX-xx.

The SHX-xx is a compact unit. All external connection points for data lines and control elements are accessible from the rear panel. The indicator elements are also on the rear panel. The front side is open and gives space for mounting line-cards.

Power Provisioning

The SHX-xx does offer different values of power to the available slot(s) for line-cards. This maximum power may not be excess, as otherwise the SHX-xx may be damaged or the plugged LineCard does not start or can not be operated properly.

The given values are the maximum power available for the LineCard(s). The power requirements for the SHX-xx itself may be slightly higher.

Table 3-1 *Power Provisioning*

Product	Max. Power	Remarks
SHX3-7W	7W	no fan inside
SHX3-10W	10W	no fan inside
SHX3-10W-RF	10W	no fan inside
SHX3-15W	15W	fan inside
SHX6-15W	15W	no fan inside
SHX3+1	15W	available power for both slots in sum, fan inside

Please check the manual of the plugged linecard to see for the power consumptions.

Front View

SHX3 Front View

Table 3-2 provides a picture of the front view of SHX3-7W. Depending on the location of the special adaptor plate, the SHX can be used for "classic" and "standard" 3RU-units.

Table 3-2 *Front View*

SHX with adaptor plate on top for standard 3RU rack mount card

Broad side on Top.

SHX with adaptor plate on bottom for traditional 3RU rack mount card

Broad side on Bottom.

arcutronix' "classic" line-cards are the 1st generation with less space on the bottom side of the PCBA, while the "standard" line-cards (or 2nd generation) offers the possibility to have higher density and assembled parts on the bottom side.

The next table (Table 3-3) gives an overview how to place the adaptor plate for different devices (arcutronix and PDT).

Table 3-3 *Matrix 3U for usage of adaptor plate*

Adaptor Plate	arcutronix		PDT	
"Standard": Broad Face on Top	EDX1000-Family CFX2, CSX4, CEX2, FCX-Family OSX-Family	0716-xxx 0803-xxx 0809-xxx 0912-xxx	CCF, OMF, CMG, ETC-A, ETC-B, SMUX-GE, CLxT	2861-xxx, 3007-xxx, 2860-xxx, 5007-xxx, 5008-xxx
"Classic": Broad Face on Bottom	EDX100, EDX1000lite	0715-xxx	ETR-CEx, FH/FL-P, FL-F, FL-E, FL-S, GM-F, GM-E, INAX-CV, SMUX-GE, CLxT	3404-xxx, 3506-xxx, 3505-xxx, 3508-xxx, 2806-xxx, 2820-001, 4610-xxx

How to change the front plate to the two different positions is depicted in "Switching the Adaptor-Plate" on page 3-10.

SHX6 Front View

The SHX6 front can be changed like the SHX3, but only very limited cases will require to do so. For 6U-LineCards, mainly the "standard" variant (see above) is available. For compatibility reasons, an old PDT LC can be supported, which is not available in the arcutronix portfolio.

Figure 3-1 *Front View of SHX6*

The following table (Table 3-4) gives an overview how to place the adaptor plate for different devices (arcutronix and PDT).

Table 3-4 *Matrix 6U for usage of adaptor plate*

Adaptor Plate	arcutronix		PDT	
"Standard": Broad Face on Top	PWX-Family	0811-xxx	COP-Family OSI	4635-xxx 1110-xxx
"Classic": Broad Face on Bottom	-	-	INV-MUX-S	4705-xxx

How to change the front plate to the two different positions is depicted in "Switching the Adaptor-Plate" on page 3-10. Follow the steps as for the SHX3, it is the same.

SHX3+1 Front View

SHX3+1 is almost the same HW as SHX6, but an additional center bar. This makes the SHX3+1 to have two slots available. From mechanical point of view, the two slots are totally equal, but from management point of view, there are two differences:

Serial access (RS232):

- The left slot does offer serial access from the rear.

- The right slot does NOT offer serial access from the rear.

Alarm-Connector:

- The left slot does offer alarm contact on the rear.

- The right slot does NOT offer alarm contact on the rear.

Table 3-5 *SHX3+1 Design*

SHX**3+1**	Serial Access	Alarm Connector
Left Slot	Yes	Yes
Right Slot	No	No

The picture below shows the front of SHX3+1, equipped with an CFX on the left side and an ISX on the right side.

Figure 3-2 *Front View of SHX3+1*

Rear View

On the rear side of the SHX, all connections for power, management and alarming can be found.

For wall-mount application, the rear side is the top-side of the unit. This is to avoid problems when a fiber-optic device is placed in the SHX. Bringing the FO connections face-

down, will never cause small radius for the cable. Small radius can lead to loss and even damage.
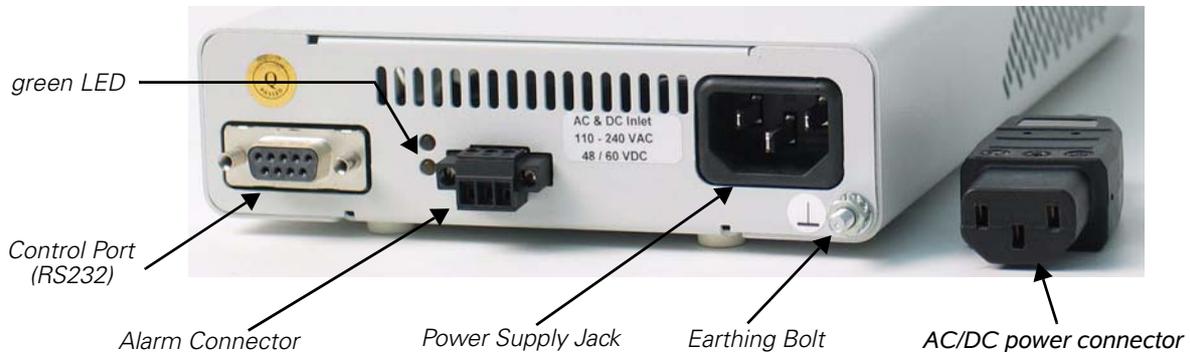

green LED

Control Port (RS232)

Alarm Connector

Power Supply Jack

Earthing Bolt

AC/DC power connector

***Figure 3-3** Rear View of SHX*

The SHX rear panel is always equipped with the control port, the alarm connector, one power supply jack and the earthing bolt. A green LED gives you indication, whether the multi voltage power supply unit is operating or not.

These components are described in the following paragraphs.

Control Port (RS232)

An D-Sub9 port offers serial access to the local management by using a VT100 terminal. The control port gives serial access to the control point of the equipped device.

NOTE: For the SHX3+1, the serial port is only connected to the left slot! Only LineCards in the left slot can be managed.For this reason, it is better to place unmanaged boards in the right slot! See table below, which LCs are unmanaged.

A rough overview of the settings for different devices can be found below. Please check in the manuals of the plugged device for details about the serial interface.

***Table 3-6** Overview of different RS232 settings*

| RS232 setting	arcutronix		PDT	
57600, 8N1	CFX2, CSX4, CEX2 FCX-Family	0803-xxx 0809-xxx	CCF, OMF, CMG, ETC-A	2861-xxx, 3007-xxx, 2860-xxx, 5007-xxx
38400, 8N1	EDX1000-Family	0716-xxx	ETC-B	5008-xxx
no serial connection via RS232 possible ("unmanaged").	EDX100, EDX1000lite, OSX-Family, ISX	0715-xxx 0912-xxx, 0803-xxx	ETR-CEx, FH/FL-P, FL-F, FL-E, FL-S, GM-F, GM-E, INAX-CV, SMUX-GE, CLxT	3404-xxx, 3506-xxx, 3505-xxx, 3508-xxx, 2806-xxx, 2820-001, 4610-xxx

Pinning

The pin assignment for the serial interface (DCE mode) is as follows:

Table 3-7 Pin assignment Control Port (RS232)

D-Sub9, female:

Pin	Assignment
1	-
2	RXD (output)
3	TXD (input)
4	DTR (input)
5	GND
6	-
7	RTS (input)
8	CTS (output)
9	-
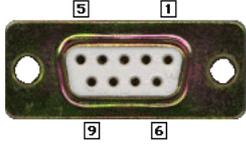
Note: The modules in the SHX operate in DCE mode, so "RXD" is an output, while "TXD" is an input!

Note: You have to connect the DTR signal (**D**ata **T**erminal **R**eady) on Pin4 as otherwise the communication will not work!

Management Features

Some management features are

* Operation mode setting
* Alarm settings (e.g. monitoring of the data line link, back-up line link, laser)
* Time and password options
* Configuration and status indication

RS232 Connection Cable

A standard RS-232 "null-modem" cable can be used to connect your PC with the SHX. It must be full equipped cable, with all 9 signals connected.
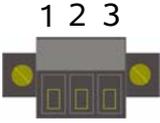
Alarm Connector

An alarm connector is used in order to indicate an alarm of the plugged device. In case there are several slots available, each slot does have it's own alarm connector.

Normally a line and/or power failure sets the unit to alarm status. Please check manual of installed device, which additional events can cause an alarm.

NOTE: For the SHX3+1, the alarm connector is only connected to the left slot! Only LineCards in the left slot can signal any alarm here.For this reason, it is better to place unmanaged boards in the right slot!

Table 3-8 shows the alarm connector settings.

Table 3-8 *Pin assignment Alarm Connector*

	Normal status	Alarm status	Pin:	Connect to:
1 2 3	1 3 2	1 3 2	1 2 3	Normally open "NO" Centre contact Normally closed "NC"

NOTE: The contact is galvanic separated. The contact rating allows a resistive load with max. 1 A, 30 V AC/DC.

Power Supply

AC and DC Mains Connector

The main connector on the rear side (according IEC-60320 C14) can be used for AC as well as DC power supply. The multi voltage converter will automatically detect the input voltage.

While working with the system, always adhere to the appropriate safety measures for handling electronic devices. Read the power precaution (see below) carefully before using any device!

Table 3-9 *Outlines AC/DC mains connector*

The device is to be operated at 115/230 V 60/50 Hz AC or 48V DC. Please check for appropriate line voltage before connecting any system to the mains.

Power Fuse

The AC- and/or DC-input is protected by a 1.6A fuse. To change the fuse, please refer to "Replacement of Fuse" on page 3-14.

AC-Power Cord

When feeding the SHX with AC-power it is recommended to use standard power cord with IEC connector on one side and the national standard on the other side. The maxi-

mum length depends on the used cable. For German and UK usage, you see two examples below. Please check with your local distributor for the right cables.

Table 3-10 *National AC power cords*

German AC-cord:

UK AC-cord:

DC Input

For DC input (-48V and GND) can be connected to the both outer pins of the power connector. The middle pin is used for PE or earthing, if available.

A rectifier is implemented inside the SHX, so it is equal, how the two pins are connected to -48VDC and Ground (GND). Table 3-11 shows an example for connection.

Table 3-11 *DC-Input Connection*

Earthing

GND

-48VDC
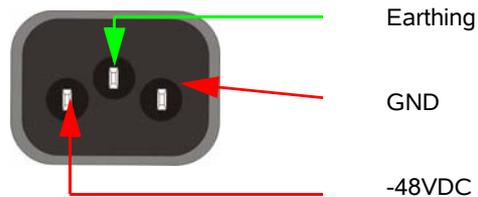
To feed the SHX with DC power, the correct DC power plug is supplied as part of the SHX. Only use the original power plug for DC-power feed. Use cables according to AWG 18, style 1015 only. Screw all terminal screws with a torque of 5 to 7 lb. in. (0.6 - 0.8 Nm).

1st Step:

1st Step:

- Loose screw and lift cape.

2nd Step:

- Prepare cable and loose the screw inside the connector.

3rd Step:

- Put the cable thimble over the DC-cable.
- Fix the DC-cable in the left and right position.

Note: The center connection can be left open, when grounding is done via grounding bolt.

- Fix the cable with the cord grip.

4th Step:

- Fix the cap, again.

Power Precautions

WARNING:

DANGER

- Disconnect the power cord before opening the device.
- Always plug the power cords into properly grounded receptacles. An improperly wired receptacle could place hazardous voltage on the accessible metal parts of the device.
- Use approved power cords only.

- Use manufacturer supplied power supplies only.

- The power supply must match the power specifications for the device.

- Unplug the instrument when replacing the fuse or changing the line voltage. Blown-up mains fuses must be replaced by fuses of the same type and ratings. Using repaired fuses or short-circuit the fuse holder are not permitted.

- Do not work on the equipment during periods of lightning activity.

NOTE: A fuse of 1 A must be installed in the 48 V voltage feed in order to make sure that the permissible current of 1 A will not be exceeded.

Earthing Bolt

The SHX-xx housing is supplied with an earthing bolt placed on the back panel, which is marked by an earth symbol.
Use this earth terminal for security measures in all units (AC and DC).

Switching the Adaptor-Plate

To rotate the adapter plate follow the instructions given below.

WARNING:

DANGER

- Disconnect the power cord before opening the device.

1. Step

Release the 4 screws on the bottom of the device:

Figure 3-4 Bottom View

2. Step

Move bottom shell and face plate apart:

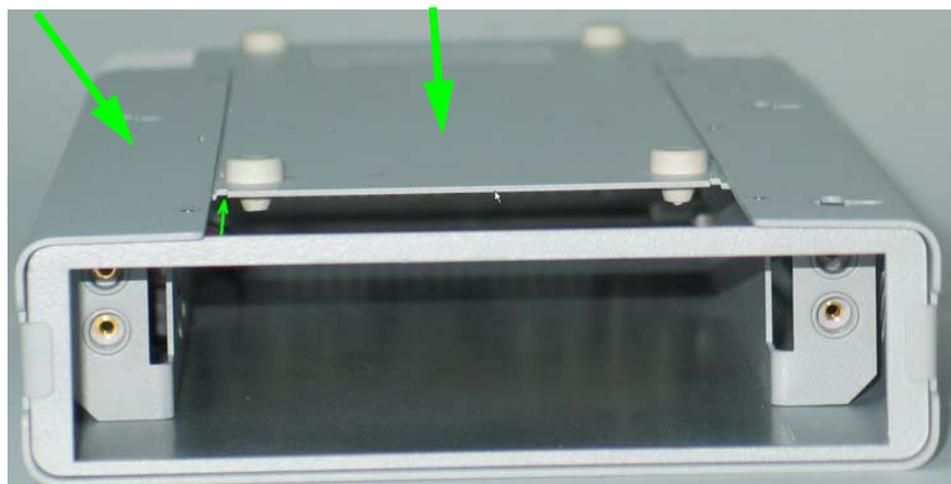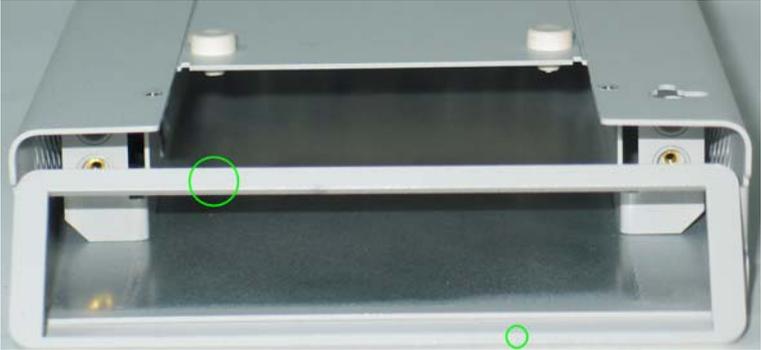Bottom Shell   Face Plate

Figure 3-5 Move Bottom and Top apart

3. Step

Place the adaptor plate in the right position to fit for the given line-card. Two positions are possible:

For "Standard" LCs:

Broad Side on Bottom
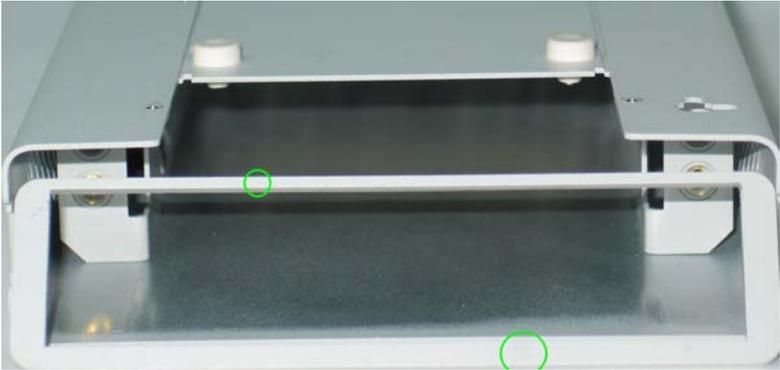

For "Classic" LCs:

Broad Side on Top

Figure 3-6 *Orientation of Adaptor Plate*

4. Step

Fix the adaptor plate in the chosen position. Put bottom shell and face plate together:
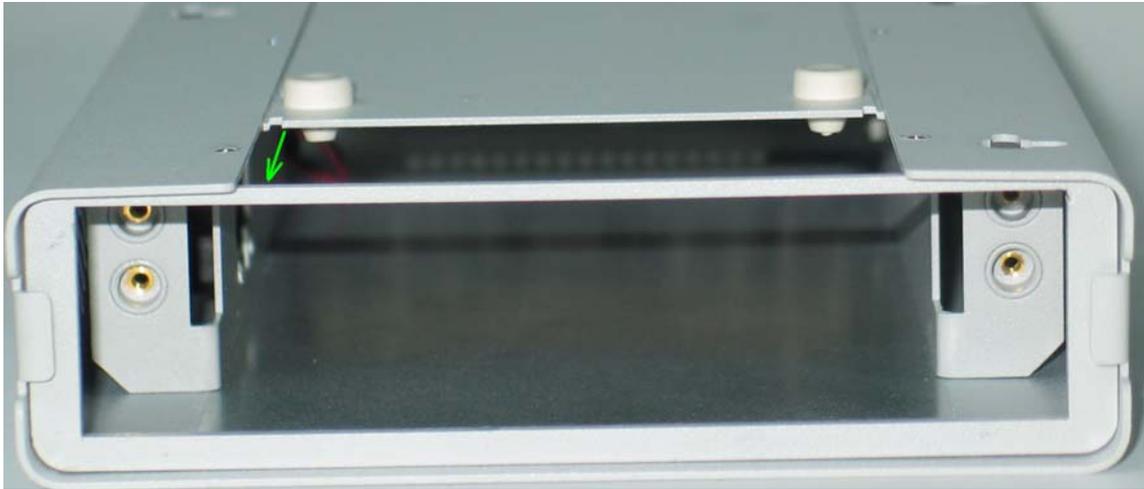

Figure 3-7 *Adaptor Plate installed*

5. Step

Fix the 4 screws on the bottom. The SHX is now ready again for installation.

Below are two examples for different line-cards installed with different orientation of the adaptor plate:

EDX1000:

(Broad Side on Top)

EDX100-S

(Broad Side on Bottom)

Figure 3-8 *Line-Cards installed*

Replacement of Fuse

In case the SHX does not start at all (green LED on the read side is OFF), the internal fuse may be damaged due to overcurrent event. In this case the fuse may be changed as depicted in the following steps.

WARNING:

DANGER

- Disconnect the power cord before opening the device.
- Use the correct fuse for replacement, otherwise seriously damage of the unit can occur!
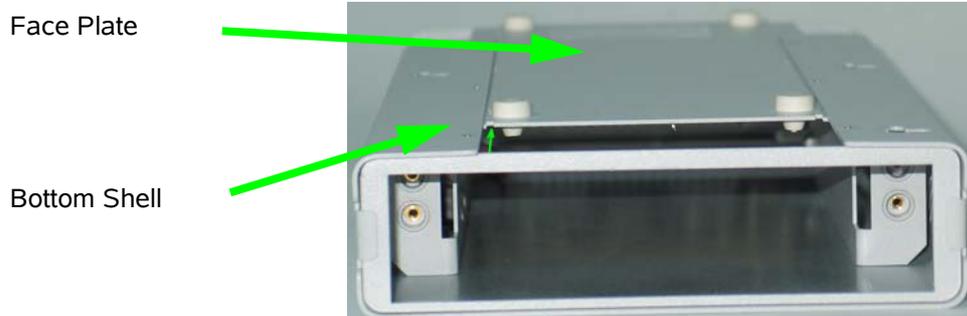 - See Table A-3 on page A-2 for details on fuse.

1. Step

Release the 4 screws on the bottom of the device:

Figure 3-9 Bottom View

2. Step

Move bottom shell and face plate apart:

Face Plate

Bottom Shell
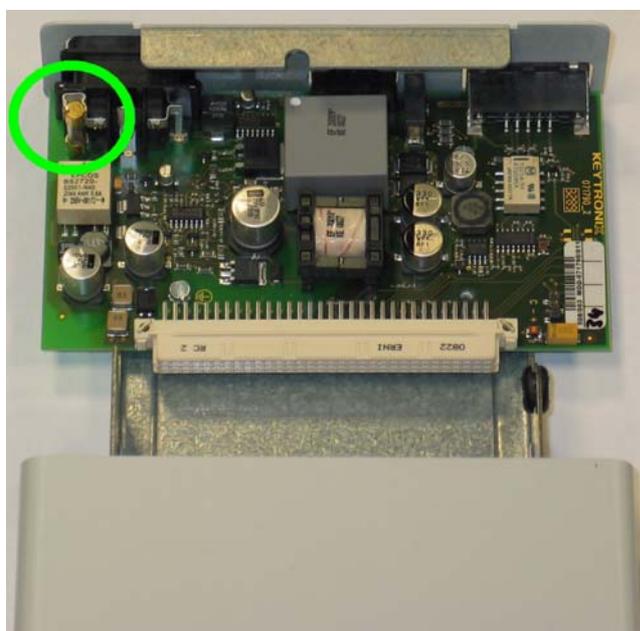

Rear-side of SHX
with Fuse.

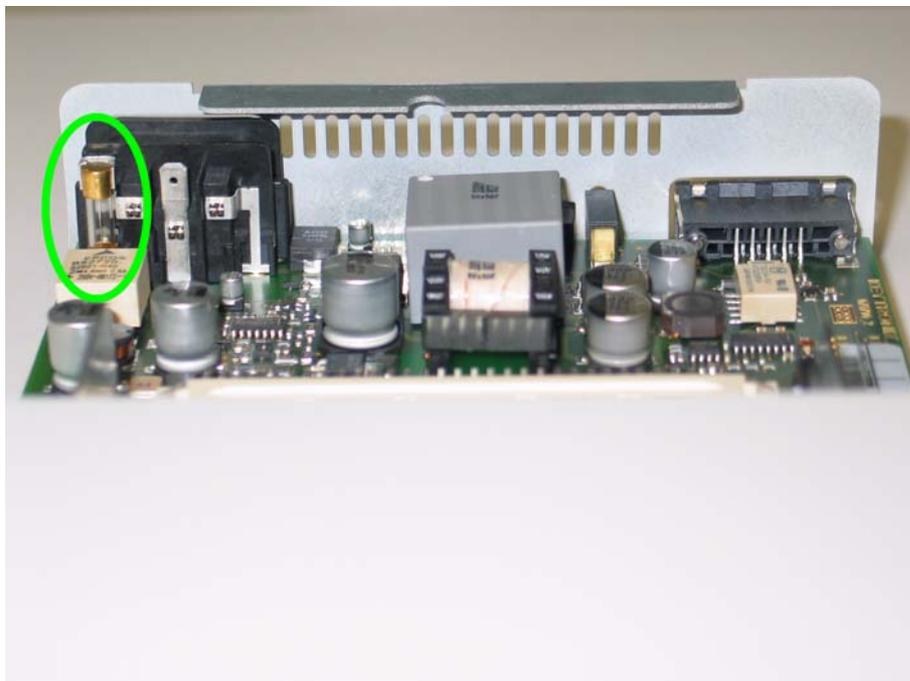*Figure 3-10* *Move Bottom and Top apart*

3. Step

Exchange fuse:

Figure 3-11 Exchange Fuse

4. Step

Fix the 4 screws on the bottom. The SHX is now ready again for installation.

Technical Information

Technical Specifications

Table A-1 shows the technical data of the SHX-xx.

Table A-1 *Technical Data*

Parameter	SHX3-7W	SHX3-10W SHX3-10W-RF	SHX3-15W	SHX3+1	SHX6-15W
Physical dimensions:					
Height (inclusive rubber feet) Width Depth (incl. grounding bolt) Weight	39 mm 144 mm 267mm 1.0 kg	39 mm 144 mm 267mm 1.0 kg	39 mm 144 mm 267mm 1.0 kg	39 mm 278 mm 267mm 1.3 kg	39 mm 278 mm 267mm 1.3 kg
Environmental conditions:					
Temperature (operation) Temperature (storage) Humidity	+5 ... +40 °C -35 ... +55 °C <100% (30°), non-cond.	-20 ... +70 °C -35 ... +55 °C <100% (30°), non-cond.	-20 ... +60 °C -35 ... +55 °C <100% (30°), non-cond.	-20 ... +60 °C -35 ... +55 °C <100% (30°), non-cond.	-20 ... +60 °C -35 ... +55 °C <100% (30°), non-cond.
Ingress Protection:					
Desktop Wall-Mounted	IP40 IP30	IP40 IP30	IP40 IP30	IP40 IP30	IP40 IP30

Table A-2 provides an overview of the electrical specifications.

Table A-2 *Electrical Specifications*

Parameter	SHX3-7W	SHX3-10W SHX3-10W-RF	SHX3-15W	SHX3+1	SHX6-15W
AC power supply					
Supply voltage Supply Voltage Tolerance Frequency Supply current Output	110/240 V AC ± 10% 50 Hz < 100 mA 5 V DC/ 1.4 A [i]	110/240 V AC ± 10% 50 Hz < 150mA 5 V DC/ 1.4 A [i]	110/240 V AC ± 10% 50 Hz < 200 mA 5 V DC/ 1.4 A [i]	110/240 V AC ± 10% 50 Hz < 200 mA 5 V DC/ 1.4 A [i]	110/240 V AC ± 10% 50 Hz < 200 mA 5 V DC/ 1.4 A [i]
DC power supply					
Supply voltage Supply current Output	48...72 V DC [ii] <200 mA 5 V DC/ 1.4 A	48...72 V DC [ii] < 300 mA 5 V DC/ 3.0 A	48...72 V DC [ii] < 500 mA 5 V DC/ 3.0 A	48...72 V DC [ii] < 500 mA 5 V DC/ 3.0 A	48...72 V DC [ii] < 500 mA 5 V DC/ 3.0 A

i. The rack mount card current must not exceed this value.
ii. -10% / +20%

Table A-3 shows the value of the fuse, if replacement is required.

Table A-3 *Fuse*

Parameter	SHX3-7W	SHX3-10W SHX3-10W-RF	SHX3-15W	SHX3+1	SHX6-15W
Fuse, type	T1.6A; 250V; 5x20	T1.6A; 250V; 5x20	T1.6A; 250V; 5x20	T1.6A; 250V; 5x20	T1.6A; 250V; 5x20

Table 0-1 shows additional specifications for SHX-xx.

Table 0-1 *More Specifications*

Parameter	SHX3-7W	SHX3-10W SHX3-10W-RF	SHX3-15W	SHX3+1	SHX6-15W
Fan	no	standard	standard	standard	standard
Alarm Connector	RIA (3 pin)	RIA (3 pin)	RIA (3 pin)	RIA (3 pin)	RIA (3 pin)
RS-232	D–Sub9 (female)	D–Sub9 (female)	D–Sub9 (female)	D–Sub9 (female)	D–Sub9 (female)
Power Connector (AC and DC)	IEC 320	IEC 320	IEC 320	IEC 320	IEC 320
Ringcore for Power Cord [i]	not required	Würth 7427155	Würth 7427155	Würth 7427155	Würth 7427155

i. A ring core on the power cord is required to achieve best results.

Drilling Template

Details

The next page shows the drilling template for wall-mounting the SHX3, SHX3+1 and SHX6. Remove the corresponding page from this manual or print it.

Note: For SHX3+1, use drilling template SHX6.

Fix the drilling template where you want to install the SHX. Two possible ways of mounting is possible to fit into your given environment.

- Upright position ("Face down") or
- Crossways ("Face left").

Watch out, that it is properly adjusted in vertical and horizontal direction.

For Upright position, the fixing holes are on position **A** and **B**.

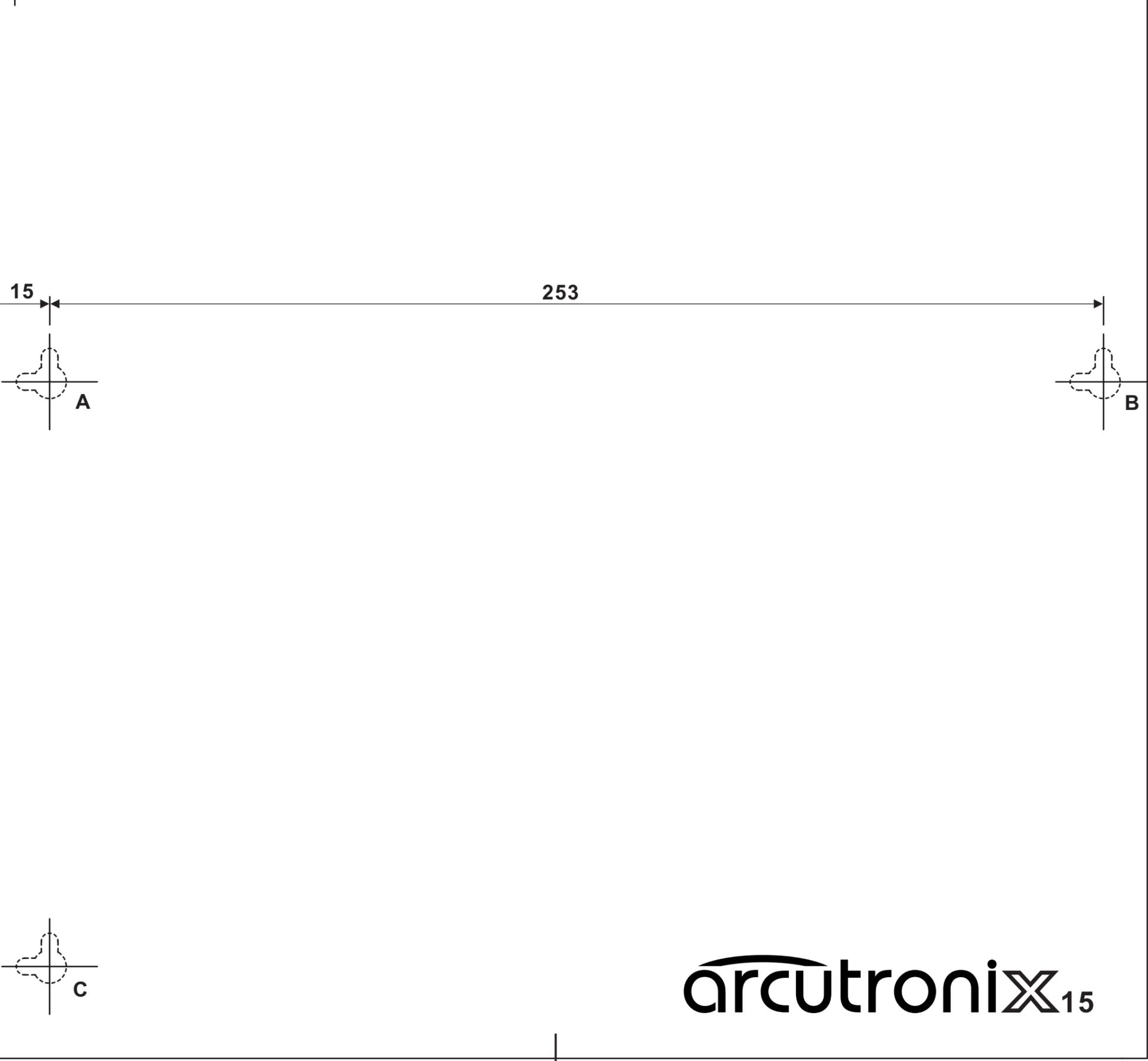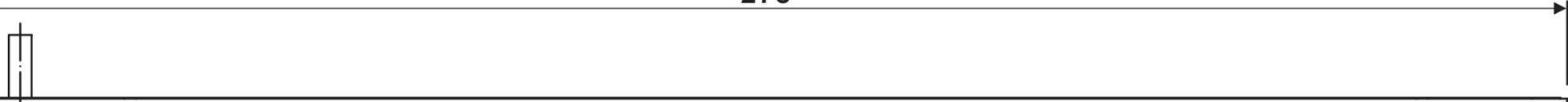For Crossways installation, the fixing holes are on position **A** and **C**.

NOTE: With the SHX a standard wall-mount kit is delivered. As wall materials vary, screws for fixing must be different than the ones attached. For advice on suitable screw check your local authority.

This page is for user's notices.

145

REAR

0719 0008-2

**SHX-3
Bohrschablone
drilling template
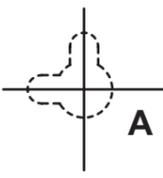Dimension: = mm
A/B/C = drill 5mm**

**Maßstab 1:1
scale   1:1**

assembly instruction:

**Range
5 - 8**

Screw

wall

15

120

A

B

254

140

C

arcutronix

22

FRONT

278

253

15

254

140

22

A

B

C
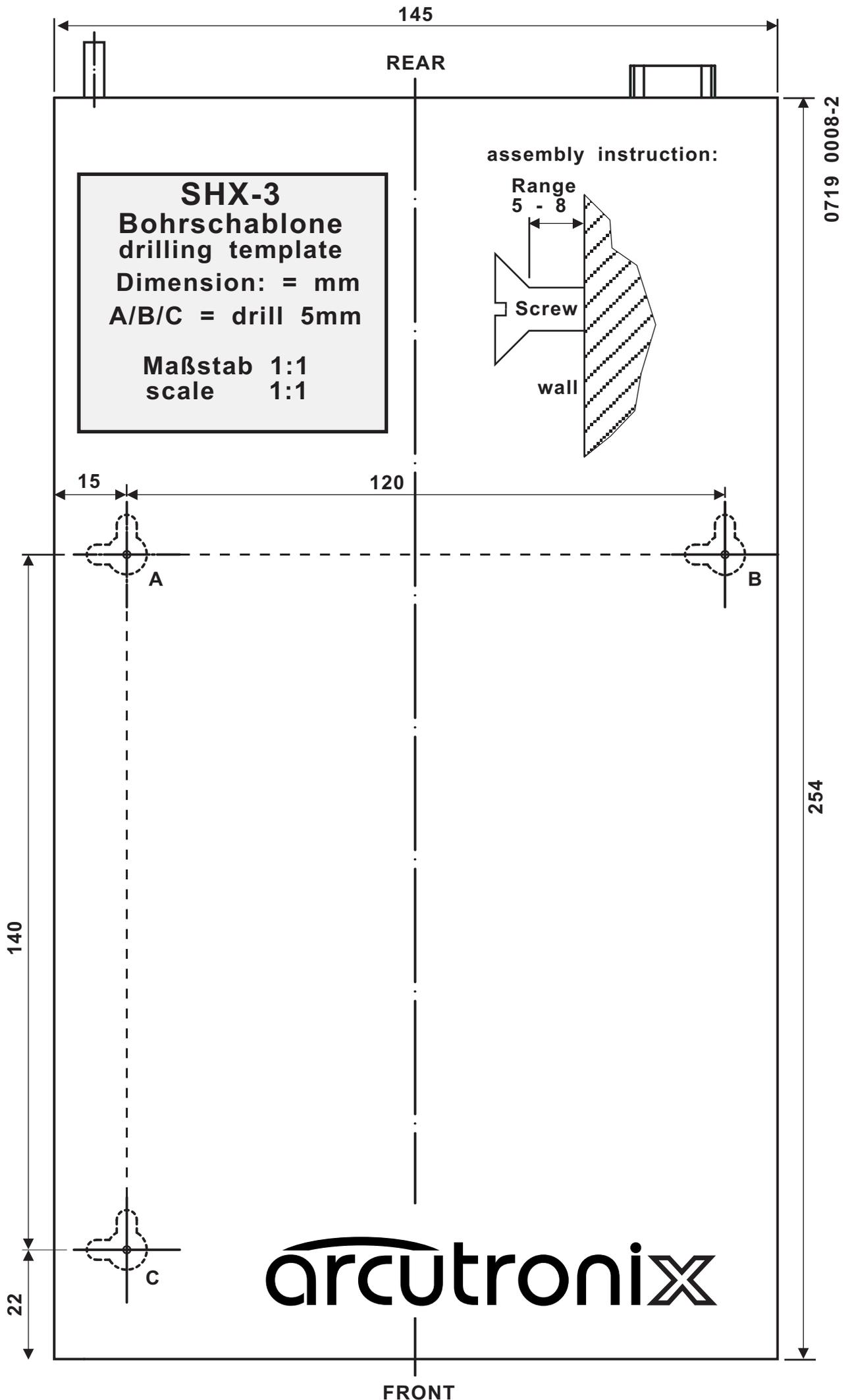
FRONT

SHX6
Bohrschablone
drilling template

Dimension: = mm
A/B/C = drill 5mm

Maßstab 1:1
scale   1:1

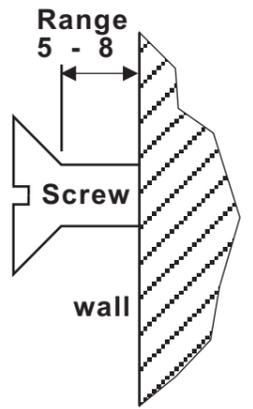assembly instruction:

Range
5 - 8

Screw

wall
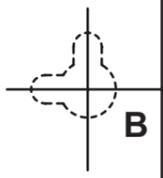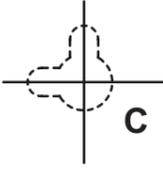
arcutroniX15

07179208-1

EC Conformity Declaration

CE   **arcutronix**

Declaration of EC-Conformity

We   arcutronix GmbH

Garbsener Landstr. 10
D – 30419 Hannover
Germany

declare under our sole responsibility that the product group

Name:	**SHX – System Housing**
Members:	**SHX3-7W, SHX3-15W, SHX6-15W, SHX3+1, SHX3-10W**
Number:	**0717-9001, 0717-9101, 0717-9102, 0717-9301, 0717-9401**

to which this declaration relates conforms to the following standards, which have been described in the CE-guideline:

93/68/EEC	CE marking
2004/108/EC	Electromagnetic compatibility (EMC)
2006/95/EC	Safety of low voltage equipment (LVD)
1999/5/EC	Radio & Telecommunications Terminal Equipment (R&TTE)
2002/95/EC	Restriction of the use of certain Hazardous Substances (RoHS)
2002/96/EC	Waste Electrical and Electronic Equipment (WEEE)

The above listed products satisfy all technical regulations, applicable to the products based on following standards:

EN 55022	Electromagnetic compatibility (EMC) for Information technology equipment
EN 55024	Electromagnetic compatibility (EMC) for Information technology equipment
EN 61000-4-1	Electromagnetic compatibility (EMC) for Information technology equipment
EN 61000-4-2	Electrostatic discharge immunity test
EN 61000-4-3	Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4	Electrical fast transient/burst immunity test
EN 61000-4-5	Surge immunity test
EN 61000-4-6	Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-11	Voltage dips, short interruptions and voltage variations immunity tests
EN 61000-6-1	Generic immunity standard – Residential, commercial and light industry
EN 61000-6-2	Generic immunity standard – Industrial environment
EN 60950	Safety of Information technology equipment

Hannover, 02.01.2010

Andreas Zimmermann
TD arcutronix GmbH