

arcutronix

@ccess the Ethernet

USER GUIDE

SRX10

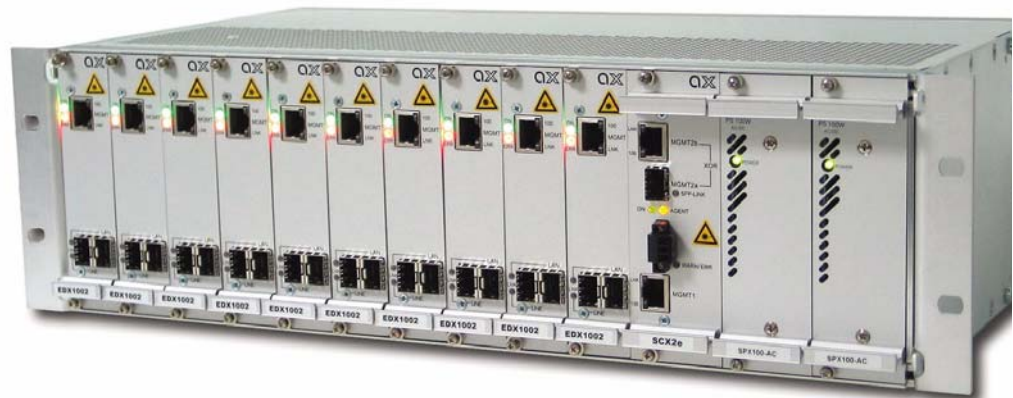


**arcutronix GmbH
Deutschland**

**Installation and
Operation Manual**

SRX - System Rack

USER GUIDE



Product Family:

SRX

Enclosed Descriptions:

Product Type Number:

SRX10

0805-9000

SRX10-RF

0805-9010

SPX100-AC

0805-5000

SPX100-DC

0805-5500

SPX200-DC-RF

0805-5600

SAX24

0805-6010

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

© Copyright 2008, arcutronix GmbH. All rights reserved.

Restricted Rights Legend: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software Restricted Rights clause at DFARS 252.227-7013 and/or the Commercial Computer Software Restricted Rights clause at FAR 52.227-19(c) (1) and (2).

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 guide describes the SRX10 chassis. It provides information on configuration, system installation and the technical data. Also, it provides the procedures to operate the components of these devices.

The intended audience of this document is anyone who is responsible for installing, maintaining or operating the SRX10 chassis. This person must be aware of the risks, affected with these actions and must be qualified and trained. **Observe the safety precautions in chapter “Safety, Instructions, Statements”.**

The manual is designed as printable book, therefore chapters start at an odd page (the last even page of the chapter before may be empty). 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 certain content, e.g. screen shots and listings are in Courier, like:

```
This is a line of a screen shot.
```

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 Multi Access Connectivity System (SRX).

Chapter 2, **Preparation & Installation:** Provides information on the site preparation.

Chapter 3, **SRX10 Chassis:** Provides the necessary information on the SRX chassis installation.

Chapter 4, **SRX10-RF Chassis:** Provides the necessary information on the remote feeding SRX chassis installation.

Appendix A, **Technical Information:** List of the available parts for the chassis.

Appendix CE, **EC Conformity Declaration:** For all SRX - System Racks.

Release History

- 2009-10-27 First issue of the SRX User Guide.
- 2011-03-23 Added and changed the following topics:
- Pictures updated, as new agent (SCX2e) is available.
- 2011-06-20 Added and changed the following topics:
- SRX10-RF added.

Table of Contents

About this Book

Document Organization	about-I
Chapters	about-I
Release History	about-II

Chapter 0 Safety, Instructions, Statements

Safety Precautions	0-1
Power Precautions	0-1
Handling Precautions	0-1
Preventing Damage From Electrostatic Discharge	0-2
Card Protection	0-2
Grounding Procedure	0-2
Fiber Optic Precautions	0-3
Technical Instructions to User	0-4
Inspection	0-4
Commissioning	0-4
Cleaning	0-4
Quality	0-5
Repair	0-5
Disposal and Recycling	0-5
CE Conformity	0-5
Electromagnetic Immunity Statement	0-5
Instructions to User	0-6
Electromagnetic Emissions Statements	0-7
Country-specific safety rules according to IEC 60950	0-8
Denmark	0-8
Korea	0-8
Finland	0-8
Norway	0-8
Sweden	0-8
Switzerland	0-8
United Kingdom	0-8

Chapter 1 Introduction

SRX Description	1-1
General	1-1
Remote Power Feeding	1-1
Application Areas for the SRX - System Rack	1-2
SRX10	1-2

SRX10-RF	1-3
SRX Functions at a Glance	1-4
Order Matrix	1-5
Accessories	1-6
The arcutronix' Multi Service Platform offers a range of accessories for an easy and space saving installation of your device into 19" cabinets or as desktop / wall-mount installation . . .	1-6
Management, Power and Fans	1-6
Cables and Blind-Plates	1-7

Chapter 2 Preparation & Installation

Preparation	2-1
Site Preparation	2-1
Requirements for Cabinets and Chassis	2-1
Environmental Specifications	2-3
Airflow Requirements	2-3
Vibration Prevention	2-4
Protecting the Fiber Optic Cabling	2-4
Requirements for Power Cables and Connection	2-4
AC-Power Connection	2-4
DC-Power Connection	2-6
DC-power plug	2-6
DC Grounding	2-7
Installation	2-7
Cabinet Installation Procedure	2-7
Connecting the SRX	2-8
Power Connection	2-8
Bonding and Grounding	2-9
Installing the SRX Chassis and Cards	2-9

Chapter 3 SRX10 Chassis

SRX10 Chassis	3-1
Front View	3-1
Power Management	3-2
Power Management Rules	3-2
Rear View	3-2
Modules and Line-Cards	3-3
Installation and Removal of Line-Cards	3-4
Insertion of axMSP Line-Cards	3-4
Inserting Standard Line-Cards, only	3-4
Inserting Classic Line-Cards, only	3-5
Mixing Line-Cards of Both System Types	3-6
Power Supply Unit (Local Power)	3-7
Power Components	3-7
Power Precautions	3-7

AC Sockets and Fuse Holder	3-8
AC-Fuse Replacement	3-8
DC Dual Power Feed Unit	3-8
DC-Fuse Replacement	3-8
Installation Procedure for a Power Supply	3-9
Removal Procedure for a Power Supply	3-9
Fan & Alarm Module	3-9
Fan Placement	3-10
Alarm Connector	3-11
Replacement Procedure for a Fan & Alarm Module	3-11

Chapter 4 SRX10-RF Chassis

SRX10-RF Chassis	4-1
Front View	4-1
Power Management	4-2
Power Management Rules	4-2
Rear View	4-3
Modules and Line-Cards	4-3
Installation and Removal of Line-Cards	4-4
Insertion of axMSP Line-Cards	4-4
Inserting Standard Line-Cards, only	4-5
Inserting Classic Line-Cards, only	4-5
Mixing Line-Cards of Both System Types	4-6
Power Supply Units (Local Power and Remote Power)	4-7
Power Components	4-8
Power Precautions	4-8
DC Dual Power Feed Unit	4-8
DC-Fuse Replacement	4-9
Installation Procedure for a Power Supply	4-9
Removal Procedure for a Power Supply	4-9

Appendix A Technical Information

Technical Specifications	A-1
SRX - System Rack	A-1
SPX - System Power	A-2
Local System Power	A-2
Remote System Power	A-2
SAX - System Alarm and Fan	A-4

Appendix CE EC Conformity Declaration

Declaration of Conformity	CE-1
-------------------------------------	------

List of Tables

Table 0-1	Effects of Cleaning Liquids	0-4
Table 1-1	Order Matrix	1-5
Table 1-2	Accessories Management, Power & Fans	1-6
Table 1-3	Accessories Cables & Blind-Plates.	1-7
Table 2-1	SRX10 Environmental Specifications	2-3
Table 2-2	SRX10 Airflow.	2-3
Table 2-3	National AC power cords	2-5
Table 2-4	DC-power Feed.	2-6
Table 3-1	Rear Views of the SRX10	3-3
Table 3-2	Matrix for classic and standard type line-cards.	3-4
Table 3-3	Possible Part Combinations	3-7
Table 3-4	AC Connectors and Fuses	3-8
Table 3-5	DC Power Feed Unit	3-8
Table 3-6	Fan Module Indicators	3-10
Table 3-7	Pin assignment Alarm Connector	3-11
Table 4-1	Rear Views of the SRX10-RF	4-3
Table 4-2	Matrix for classic and standard type line-cards.	4-5
Table 4-3	Possible Part Combinations	4-7
Table 4-4	DC Power Feed Unit	4-8
Table A-1	Physical Dimensions	A-1
Table A-2	Electrical Specifications	A-2
Table A-3	Physical Dimensions SPX.	A-2
Table A-4	Electrical Specifications	A-3
Table A-5	Physical Dimensions SPX.	A-3
Table A-6	More Specifications.	A-4
Table A-7	More SAX Specifications	A-4

List of Figures

Figure 1-1	SRX applications in a modern network.	1-3
Figure 1-2	SRX10-RF application with Remote feeding via CSX4-RF	1-4
Figure 2-1	AC-Power connectors.	2-5
Figure 2-2	DC-Power connectors	2-6
Figure 2-3	Installation of the SRX10 Chassis into a Cabinet.	2-8
Figure 3-1	Front View of an Equipped SRX10 Chassis.	3-1
Figure 3-2	SRX10: Inserting axMSP standard Line-Cards	3-5
Figure 3-3	Adapter Plate Kit	3-5
Figure 3-4	SRX10: Inserting axMSP classic Line-Cards	3-6
Figure 3-5	SRX10: Inserting axMSP classic and standard Line-Cards	3-6
Figure 4-1	Front View of an Equipped SRX10-RF Chassis.	4-2
Figure 4-2	SRX10-RF: Inserting axMSP standard Line-Cards	4-5
Figure 4-3	Adapter Plate Kit	4-6
Figure 4-4	SRX10:-RF Inserting axMSP classic Line-Cards	4-6
Figure 4-5	SRX10-RF: Inserting axMSP classic and standard Line-Cards	4-7

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, IEC, your PTT, or other similar organizations.

Power Precautions



WARNING:

- 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.
- A circuit breaker (automatic cutout, FI-switch, e.t.c.) must be installed in the supply wiring to each power receptacle. The wiring for the DC power receptacle must also be equipped with a manual circuit breaker.

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 electrostatic 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 chassis.

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

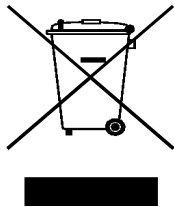
Repair

There are no repairable parts in the device. Defective parts must be sent to arcutronix 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 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

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.



WARNING: 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.

Country-specific safety rules according to IEC 60950

Denmark

“Supply cord shall be provided with a plug according to the Heavy Current Regulations, Section 107-2-D1.”

Korea

“Plugs for the connection of the apparatus to the supply mains comply with the Korean requirement (KSC 8305).”

Finland

“Laite on liitettävä suojamaadoitus-koskettimilla varustettuun pistorasiaan.”

Norway

“Apparatet må tilkoples jordet stikkontakt.”

Sweden

“Apparaten skall anslutas till jordat uttag.”

Switzerland

“Supply cords shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets:

SEV 6532-2.1991, Plug type 15, 3P+N+PE 250/400 V,10 A

SEV 6533-2.1991, Plug type 11, L+N 250 V,10 A

SEV 6534-2.1991, Plug type 12, L+N+PE 250 V,10 A

United Kingdom

“Apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a "standard plug" in accordance with Statutory Instrument 1786: 1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations.”

NOTE: "Standard plug" is defined in SI 1786: 1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.

Chapter 1

Introduction

SRX Description

General

The SRX - System Rack is arcutronix's platform and housing for a wide bunch number of different services. No matter which service, group of services or mixture of services are needed to be installed in a 19" chassis, the SRX is the best choice to get highest density on small footprint.

The SRX offers a simple and flexible solution to build high density systems in a 19"- or ETSI-rack. All arcutronix 3RU or 6RU line-cards can be housed in the SRX, offering 10 or 24 slots in a chassis of 3RU or 6RU in height. Each SRX has in addition 2 slots for power supply to achieve carrier-class power redundancy. Both AC and DC power supplies are available. The System-control card (SCX), which is placed in a reserved slot, offers easy access to the system and provides management access from local or remote stations. The integrated SNMP-agent and Web-IF-server allow OAM with standard tools.

The universal system rack provides a smart solution to get convenient options and possibilities for the users. Due to its unique technical advantages and the high level of flexibility the SRX achieves optimum performance as well as maximum protection for user's applications.

The SRX is designed for Central office and cabinet applications. The integrated alarm connectors and fan-unit opens the opportunity to monitor the system and the operator is quick informed in case of any failure.

SRX is part of arcutronix's Multi Service Platform (axMSP).

Remote Power Feeding

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 SRX10-RF (Remote Feeding) supports this feature as "Feeding Unit" in cooperation with the "Fedded Housing" SHX3-10W-RF. The SRX10-RF is usually installed in an CO environment. It can house 10x CSX4-RF and can feed via TP 10x CSX4-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.

Application Areas for the SRX - System Rack

SRX10

The SRX - System Rack is used in 19" and ETSI racks, when more than 10 service- and/or line-cards are (planned) to be installed at the specific location. It can be equipped with AC and/or DC power supplies to fit into typical telecom installations as well as in other application scenarios. Redundancy (AC + AC, DC + DC or AC + DC) gives security and carrier class availability.

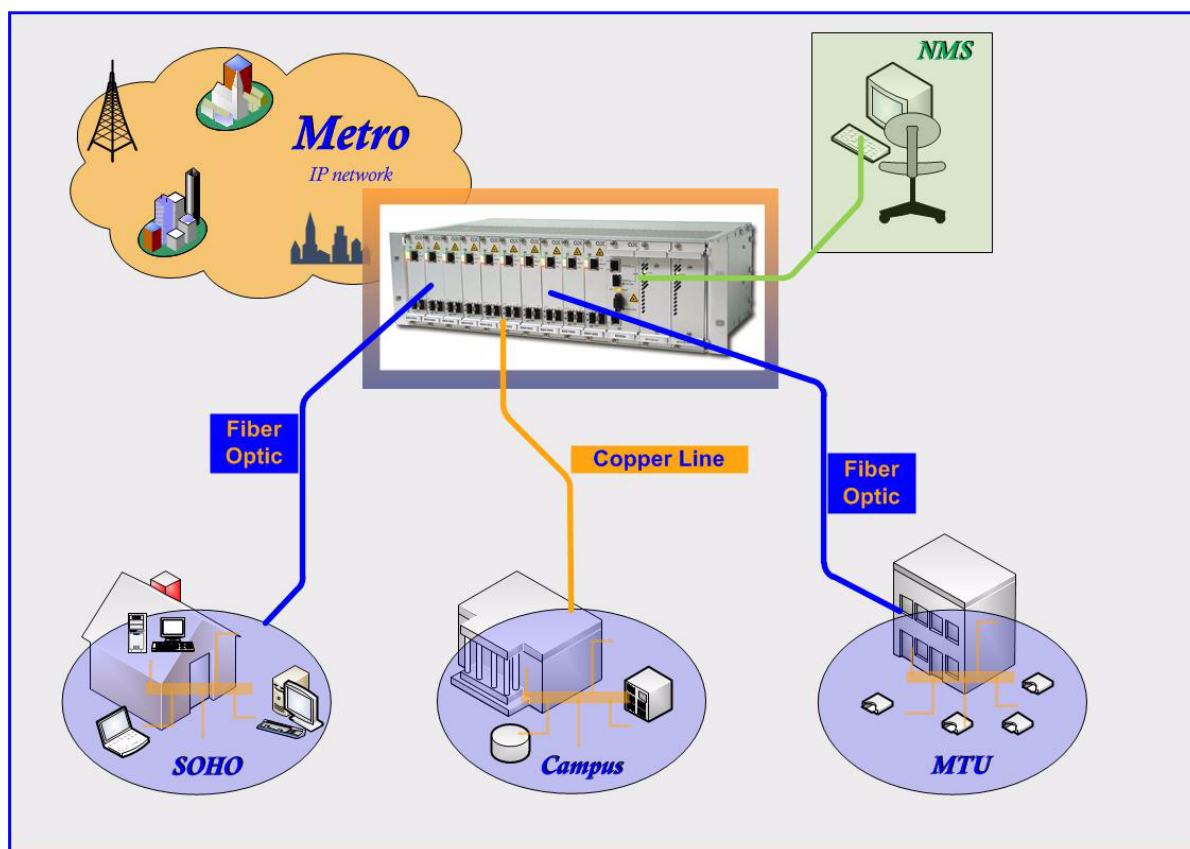


Figure 1-1 SRX applications in a modern network

SRX installed on the edge of Metro networks is the root for a lot of applications in the access and First Mile area. Either copper or fiber optic installation can be served from the Central office or cabinet.

Full management capability for installed and remote connected line-cards offers the operator easy access and supervisory for the installed infra-structure.

SRX10-RF

The SRX10-RF is capable for remote feeding. It has the same mechanical dimensions as the SRX10 and can be installed and used at the same locations. It is housing the same number of Linecards (10x) and the SCX2e (1x).

The big difference is that the Remote Power Feeding Unit (SPX200-DC-RF) can be plugged in one of the 2 power slots. This unit provides 190VDC to the Linecard-slots, made out of -48...-60VDC. Any Linecard, which is able to take this voltage (e.g. CSX4-RF) can use it to put it onto the copper-line. The remote-feeding voltage is over-current protected to give safety in case of short circuit or personal contact.

NOTE: The SRX10-RF does support only DC power supply.

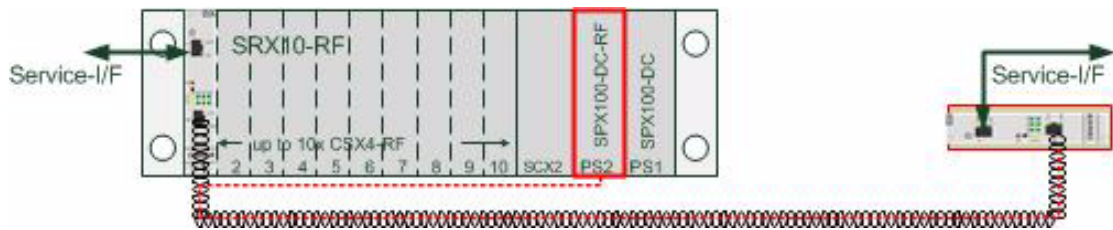


Figure 1-2 SRX10-RF application with Remote feeding via CSX4-RF

SRX Functions at a Glance

General:

- Cage for arcutronix' 3RU rack mounted line-cards
- Capacity: up to 10 line-cards
- Low OPEX due to very high density of line interfaces

Power Supply:

- Redundant power supply
- AC and DC power supply available
- Power Management / Power Consumption Control

Management:

- System controller card for SNMP agent, Web-GUI and ssh-access.
- Local and remote management access.
- Automatic chassis type detection and identification

- Alarm contact

Miscellaneous:

- Optional ventilation unit with fan (necessary for FCX10G/FCX10G2 line-cards)
- Additional alarm relays on the rear side (alarm or fan card with alarm) as option

Order Matrix

The order matrix shows the available variants of the SRX - System Rack. Further options are possible on request.

Table 1-1 Order Matrix

Art.- No.	Short Name	Description
0805-9000	SRX10	Rack mount shelf: <ul style="list-style-type: none">• 19" chassis;• High: 3RU;• 10x slots for line-cards;• 1x slot for management;• 2x slots for modular AC (115/230V) and/or DC (-48V) power supplies;• with adjustable side fixing plates.
0805-9001 (obsolete!)	SRX10-6	Rack mount shelf: <ul style="list-style-type: none">• High density 19" chassis;• High: 6RU;• 10x slots for 6U-line-cards;• 1x slot for management;• 2x slots for modular AC (115/230V) and/or DC (-48V) power supplies;• with adjustable side fixing plates.
0805-9010	SRX10-RF	Rack mount shelf: <ul style="list-style-type: none">• 19" chassis;• High: 3RU;• 10x slots for line-cards;• 1x slot for management;• 1x slot for modular DC (-48V) power supply;• 1x slot for modular DC (-48V) remote feeding power supply;• with adjustable side fixing plates.
0805-9500 (obsolete!)	SRX24	Rack mount shelf: <ul style="list-style-type: none">• High density 19" chassis;• High: 6RU;• 24x slots for line-cards;• 1x slot for management;• 2x slots for modular AC (115/230V) and/or DC (-48V) power supplies;• with adjustable side fixing plates.

Accessories

The arcutronix' Multi Service Platform offers a range of accessories for an easy and space saving installation of your device into 19" cabinets or as desktop / wall-mount installation

Management, Power and Fans

Table 1-2 Accessories Management, Power & Fans

Art.- No.	Short Name	Description
0805-7020	SCX2	System Controller for connectivity and FCX10G/FCX10G2 system devices: <ul style="list-style-type: none">• SNMP, web-GUI, Telnet, Terminal Management;• 3RU rack mount card.
0903-3000	SCX2e	System Controller for ax-system devices: <ul style="list-style-type: none">• SNMP, web-GUI, Telnet, Terminal Management;• 3RU rack mount card.
0805-5000	SPX100-AC	Power Supply for chassis type SRX: <ul style="list-style-type: none">• redundancy-capable (int);• 8 HPⁱ panel;• single voltage 5 V DC, 20 A;• mains supply: 115/230 V AC;• 3RU rack mount card.
0805-5500	SPX100-DC	Power Supply for 19" chassis type SRX: <ul style="list-style-type: none">• redundancy-capable (int);• 8 HPⁱ panel;• single voltage 5 V DC, 20 A;• mains supply: -48 V DC;• 3RU rack mount card.
0805-5600	SPX200-DC-RF	Power Supply for 19" chassis type SRX: <ul style="list-style-type: none">• Remotefeeding Unit 48V (in) to 190V (out), 200W;• 8 HPⁱ panel;• single voltage 190V DC, 0.6 A;• mains supply: -48 V DC;• 3RU rack mount card.

Table 1-2 Accessories Management, Power & Fans

Art.- No.	Short Name	Description
0805-6010	SAX24	19" chassis Fan module with integrated alarm card for chassis type SXR: <ul style="list-style-type: none">• 2x Fan;• 4x Alarm connector;• LEDs;• Coverplate.

i. HP = Horizontal Pitch; 5.08mm = 1/5 inch.

Cables and Blind-Plates

Table 1-3 Accessories Cables & Blind-Plates

Art.- No.	Short Name	Description
0500-001	PC-E	Power cord, European plug.
0500-002	PC-B	Power cord, Great Britain plug.
0805-6100	BPX36c	Blind-plate for ax-shelves: <ul style="list-style-type: none">• 3RU, 6WU;• usage at LC-slots;• for classic usage.
0805-6110	BPX36s	Blind-plate for ax-shelves: <ul style="list-style-type: none">• 3RU, 6WU;• usage at LC-slots;• for standard usage.
0805-6200	BPX38	Blind-plate for ax-shelves: <ul style="list-style-type: none">• 3RU, 8WU;• usage at PS-slots and classic Management-slots.
0805-6210	BPX385	Blind-plate for ax-shelves: <ul style="list-style-type: none">• 3RU, 8,5WU;• usage at SCX2 Management-slots.

Table 1-3 *Accessories Cables & Blind-Plates*

Art.- No.	Short Name	Description
0805-6800	APX3FOT	Fibre Optic Tray for ax-shelves: <ul style="list-style-type: none">• Fold-away tray to deposit and secure fiber-optic cables in front of shelves.
0805-6900	APX3RUE	Adapter Plate for ax-shelves: <ul style="list-style-type: none">• 3RU adapter kit for ETSI mounting;• left and right side• incl. screws.

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

Chapter 2

Preparation & Installation

The information in this chapter will assist you in preparing your site for the installation of the SRX - System Rack.

Preparation

For a successful SRX installation you must have all required equipment (cables, connectors, etc.), a proper environment, and an installation plan.

Site Preparation

The following two items are critical to the success of the installation and must be in place prior to arcutronix-authorized personnel arriving on-site to install the equipment.

1. Permanent power outlets for the systems.
2. All cables connecting the arcutronix systems to hosts or peripherals.

You are also expected to provide the following:

- Perform an OTDR (optical time domain reflectometer) end-to-end measurement to determine the line length/line attenuation and return loss.
- Coordinate and develop an Implementation and Test Plan in conjunction with arcutronix's System Engineer (SE), this is to be completed prior to installation.
- adequate space for the unit installation.
- cabinet(s)
- adequate environmental conditions.

Requirements for Cabinets and Chassis

The SRX10 chassis is designed to be installed in 19 inch cabinets. The placement of the cabinet must satisfy the environmental specifications listed in the section "Environmental Specifications". The cabinet must be placed less than 2 meters (6.6 feet) from the power receptacles, as the AC and DC power cords for the SRX are 2 meters long.

The chassis or cabinet must conform with the Sub-clauses in UL 1950. The equipment is intended to be installed by service personnel according to the manufacturer's instructions, and the customer's investment in the equipment is significant enough that the consequences of incorrect installation will be considered.

Preparation & Installation

Preparation

These guidelines assume that individual chassis mounted equipment will not be submitted at a later date as part of an end use of chassis/cabinet listing investigation. Therefore, all installation concerns need to be addressed as part of this investigation.

Chassis mounted equipment is subjected to a performance test program similar to that conducted on stationary floor-mounted equipment. The heating test in accordance with Sub-clause 1.4.7 is conducted to account for the manufacturer's maximum recommended ambient temperature (T_{mra}). The abnormal operation test verifies, that minimal requirements are in compliance with the parameters in Sub-clause 5.4.9 with one set of vents or with one side of the enclosure blocked at a time.

NOTE: The Instructions in this book for suitable installation of the equipment in a chassis must be followed. The maximum operating temperature (T_{mra}) of +40 °C must not be exceeded.

Elevated Operating Ambient Temperature: If installed in a closed or multi unit chassis assembly, the operating ambient temperature of the chassis environment may be greater than room ambient temperature. Therefore, the following consideration should be taken:

- a. How to install the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (T_{mra}).
- b. **Reduced Air Flow:** The installation of the equipment in a chassis should be such that the amount of air flow required for safe operation of the equipment is not compromised. The air intake and the air exhaust need special attention in cabinets with closed doors.
- c. **Mechanical Loading:** Mounting of the equipment in the chassis should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- d. **Circuit Overloading:** Consideration should be taken to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. A circuit breaker (automatic cutout, FI-switch, e.t.c.) must be installed in the supply wiring.
- e. **Reliable Earthing:** Reliable earthing of chassis mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).



WARNING: To ensure proper grounding use the manufacturer supplied power cords only. If only the DC supply is used, the SRX has to be connected to an electrical earth by using one of the marked earth terminals at the rear side of the SRX. **It is strictly prohibited to operate the SRX without grounding!**

Environmental Specifications

You must install the SRX in a clean, dry, and sheltered environment. Do not expose it to external elements. The air must be free of excessive dust and humidity.

Table 2-1 provides the environmental specifications for the SRX10.

Table 2-1 SRX10 Environmental Specifications

Environmental Parameter	Specification
Operating Temperature	+5 to +40 °C
Storage/Transport Temperature	-30 to +80 °C
Operating Humidity	10 to 90% (non-condensing)

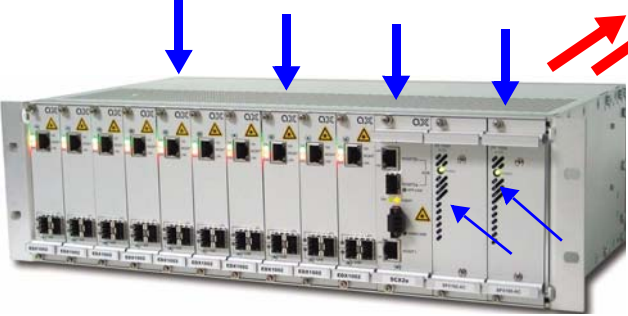
Airflow Requirements

Table 2-2 shows the airflow conditions of the SRX.

NOTE: The air flow concept requires closed card slots. Always mount cover plates on empty slots to avoid local increase of temperature.

Cover plates and power cords for the system must be ordered separately. For order information refer to Table 1-3 on page 1-7.

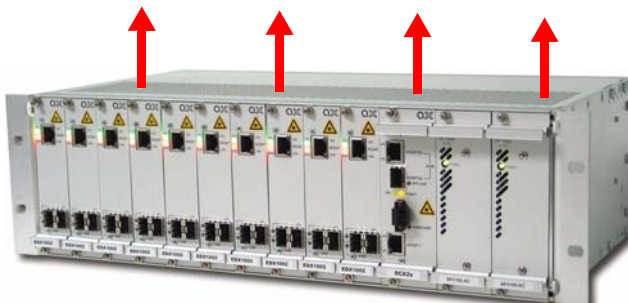
Table 2-2 SRX10 Airflow



With ventilation:

The fans pour warmed air backwards out of the system while cooled air is sucked in through the ventilation slits at the chassis' top side or the ventilation slits of the rack mount cards.

Note: Never obstruct the ventilation slits! The airflow must be undisturbed.



Without ventilation:

Warmed air can escape through the ventilation slits at the chassis' top side.

Note: Never obstruct the ventilation slits!

Vibration Prevention

Avoid exposing the system to shocks or vibrations. If you need to use the system for mobile applications, such as an emergency data center, use shock absorbers to prevent excessive vibrations. Pack the SRX - System Rack securely prior to transport to avoid exposing the system to excessive vibrations.

Protecting the Fiber Optic Cabling

If fiber optic cables are used, extra care must be taken during and after the installation to prevent damaging these optical cables. Optical cable routing needs to be performed in accordance to the standard. The minimum bend radius cannot be less than 20 times the diameter of the cable. If you use tie wraps, ensure that they are not tight. If the tie wraps are tight they may cause permanent damage.

Take precautions to protect the fiber optic cabling from unnecessary bending. Place the fiber optic cabling in ducts/conduits to protect it from excessive bending and damage.

You must ensure that the cabinet provides adequate clearance (100mm) for the cabling.

Requirements for Power Cables and Connection

Each power supply is connected to one mains jack or the DC jack. Each mains jack has its own power cord. For redundancy use a separate power receptacle for each power cord.

The following sections provide the power receptacle requirements for the SRX chassis. A circuit breaker (automatic cutout, FI-switch, etc.) must be installed in the supply wiring to each power receptacle. The wiring for the DC power receptacle must also be equipped with a manual circuit breaker.

AC-Power Connection

The SRX is prepared to host up to 2x AC-Power-Supplies to feed the chassis, cards and fans in a redundant manner. Two AC-connectors are available on the left rear-side of the chassis.



Figure 2-1 AC-Power connectors

Both connectors are according IEC-60320 C14 and carry a exchangeable fuse of 2.5A. The top-connector (called A in the figure above) is for the left power supply and connector B is for the most right one.

CAUTION: It is strongly recommended that the second power cord on the chassis is supplied by different sources (phases) to provide redundancy.

AC power must be supplied via a power cord which has IEC connector on one side and the national standard on the other side. The maximum 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 2-3 National AC power cords

German AC-cord:



UK AC-cord:



DC-Power Connection

The SRX is prepared to host up to 2x DC-Power-Supplies to feed the chassis, cards and fans in a redundant manner. Two DC-connectors are available on the right rear-side of the chassis.





Figure 2-2 DC-Power connectors

DC-power plug

To feed the SRX with DC power, the correct DC power plug is supplied as part of the SRX. Only use the original power plug for DC-power feed.

The allocation of the DC Dual Power Feed Unit is shown in Table 2-4.

Table 2-4 DC-power Feed

	<ul style="list-style-type: none">- DC PS #2, minus potential 48 V DCDC PS #2, plus potential 48 V DC
	<ul style="list-style-type: none">- DC PS #1, minus potential 48 V DCDC PS #1, plus potential 48 V DC

NOTE: In most cases, the positive DC power is connected to GND (0V) and the negative DC power is -48VDC.

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).



WARNING: Never disconnect the DC power plugs during the SRX is in operation. The power plugs are not designed for disconnection on power load.

DC Grounding

Chassis grounding is mandatory. Therefore, connect the grounding bolt to ground. Use min. 2.5mm² (AWG 13) for the ground wire. Fasten the screw!

This equipment must be connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from the earthing terminal bar or bus to which the DC supply system earthing electrode is connected.

This equipment must be located in the same immediate area (such as adjacent cabinets) as any other equipment that is connected to the earthed conductor and the point of earthing of the DC system. The DC system must not be grounded elsewhere.

The DC system is to be located within the same premises as this equipment.

There must be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

Installation

The SRX chassis is heavy. It is strongly recommended not to perform the installation alone. At least two persons are required to lift the system.

NOTE: You should always use rails when installing a chassis in a cabinet. Installing rails in the cabinet will take weight from the system during installation and removal.

NOTE: Do not attach the line cables and interface cables before the system is installed in the cabinet.

Cabinet Installation Procedure

Use the following procedure to install the SRX chassis in a 19 inch cabinet:

Tools Required: A medium Phillips and flat head screwdriver are required for this procedure.

NOTE: Make sure that you have an adequate number of the mounting screws and nuts that are required for the installation before you begin. The chassis is heavy, you will need assistance during the installation.

1. Remove any unnecessary plates near the installation location in the cabinet that could obstruct the airflow.

2. Measure the correct positions for the nuts in the cabinet and place the nuts in the cabinet's rails.
3. Lift the system and place it in its desired position.
4. Using the screwdriver secure the 2 diagonally opposite screws.

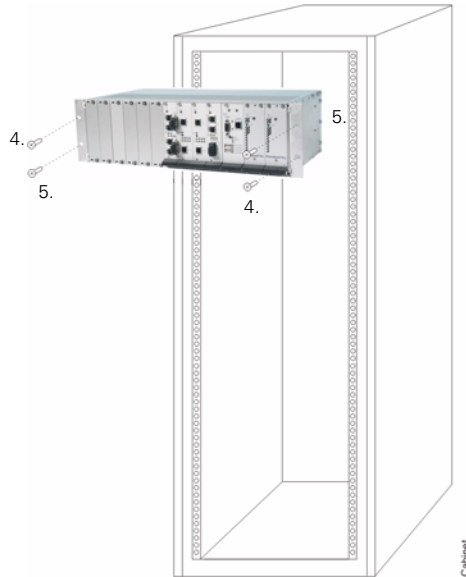


Figure 2-3 Installation of the SRX10 Chassis into a Cabinet

5. Secure the two remaining screws.
6. Route the cabling.

CAUTION: Do not exert any mechanical force on the cables. The fiber optic cables are very susceptible to damage.

7. Connect all cables. Refer to the section “Connecting the SRX” on page 2-8, for the cabling procedures.
8. Plug the power cords into the receptacles.

If you install the SRX chassis in a cabinet larger than 19 inches, the installation of a plate in the cabinet that can support the weight of the SRX is recommended.

Connecting the SRX

The following sections provide instructions for cabling the SRX chassis.

Power Connection

The SRX chassis provides two slots for power supplies, which can be either AC- or DC-type. The power supplies for AC and DC must be ordered separately. For order information refer to Table 1-2 on page 1-6.

Each of the slots does have an AC IEC-connector and a DC-connector on the rear side. For AC-power feed, use a standard AC-cord, as it is used in your country. As each

country has national standards for plugs, refer to your local arcutronix representative if you need help.

For DC-power feed, a DC-plug is provided together with the SRX chassis. Use at least AWG18 cables to feed the DC-power supplies.

Bonding and Grounding

Generally, the earthing of the SRX chassis can be realized by using the AC power cord. For DC supply, the SRX has one M-6 earthing bolt at the rear side, which is marked by an earth symbol. This earthing bolt is to be used for sufficient earthing of the chassis.

Additionally, most cabinets (chassis) feature a ground terminal inside, to be used as central earth point. Each chassis in the cabinet is on earth potential due to mounting to the metal frames of the chassis. The earthing point of the cabinet is connected to a copper wire of sufficient diameter to earth.

Use only copper wires for grounding (min. 2.5mm², AWG 14).

Remove the two nuts, the two star washers. Use a 2 hole compression lug with 6.5mm holes in a centre-to-centre spacing of 16mm to hold the ground wire.

Mount the wire with the lug (Panduit) and the two star washers with the M-6 nuts to the M-6 bolts. Use a 10mm wrench. Fasten all screws.

Installing the SRX Chassis and Cards

Clean and inspect all optical connectors prior to installation.

Use the following procedure to install the main system:



WARNING: Attach a wrist strap and follow the ESD procedures during the handling of all electronic components. Refer to the grounding procedure in section “Preventing Damage From Electrostatic Discharge” on page 0-2.



WARNING: Laser Class 1. 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. Before inspecting a cable with a microscope, ensure that it is not carrying an optical signal.



WARNING: Before installing the chassis you must ensure that all fiber optic specifications, valid for your SRX, are kept. If necessary put in attenuator. Otherwise, rack mount cards can be destroyed.

1. Plug the power cords into properly grounded receptacles. Plug each cord into a separate outlet for redundancy. Refer to the section “Requirements for Power Cables and Connection” on page 2-4 for the receptacle requirements of the SRX.

Chapter 3

SRX10 Chassis

This chapter provides information on the components and configurations of the SRX10 chassis.

SRX10 Chassis

The SRX10 chassis can be equipped with up to ten line-cards, one agent (SCX2e) and two power supplies (SPX) from the front side and with a alarm/fan module from the rear side.

With SCX2e System Controller Card several management opportunities are possible like SNMP, ssh, web-based management to monitor and configure the entire system local and remote.

Front View

The front view of the SRX10 chassis in Figure 3-1 illustrates the placement of the cards.

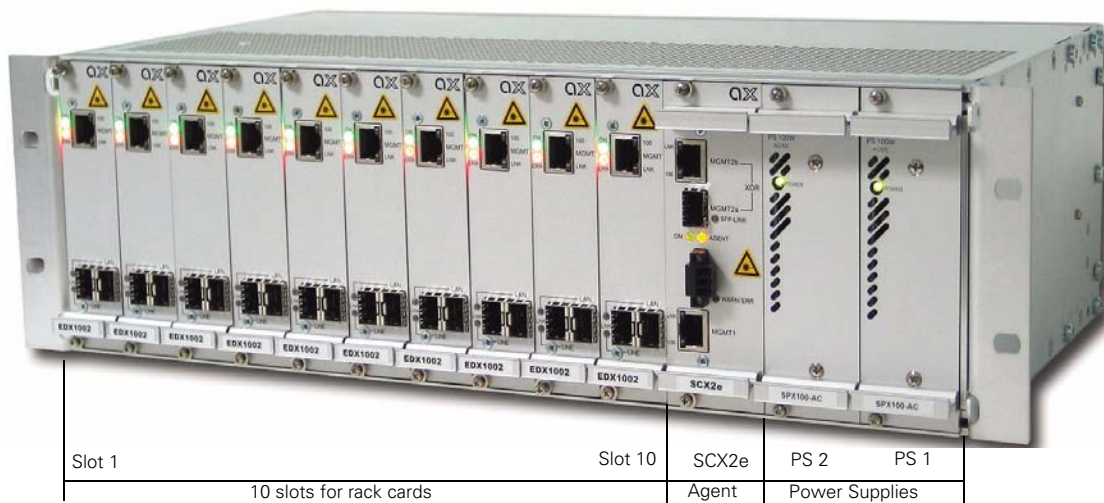


Figure 3-1 Front View of an Equipped SRX10 Chassis

The ten slots for line-cards (LC), the SCX2e card, and two power supplies are accessible from the front side. The line cabling, fiber optic or copper, is also attached at the front side of the system.

Power Management

The intelligent SRX10 power management is a power share bus indicating the available power left to feed the rack mount cards. This allows an effective utilization of the power supply capabilities.

The chassis has its specific power to feed the rack mount cards. This power depends on the capabilities of the power supply device used. The remaining power of the chassis will be reduced by each inserted unit. The SRX has an integrated power management unit, which signalizes the remaining power after a card has been inserted.



Read the following descriptions of the SRX10 power management and the management rules carefully, before inserting any equipment into the SRX!

Power Management Rules

- If the whole system is powered up, cards with priority status will be switched on first. Cards with priority status are alarm and fan cards and rack mount cards of the backward compatible System 2100. Next in the hierarchy of priority are the agents, at last the rack mount cards in slot 1, 2, 3, etc. The system analyzes automatically, if there is enough power left to feed the units.

NOTE: It is mandatory to remove a card which has been rejected by the power management.

- If the remaining power is not sufficient, the SRX10 unit, e.g. agent or modem card, will not be powered up. There is one exception: Cards with priority status will always be switched on!

The decision if a unit will be powered up or not will be taken:

1. if a new card is inserted into the SRX or
2. if the whole system is powered up.

Once taken, this decision will not be revised!

NOTE: Violation of the rules can cause overloads in the power management. Such a failure will be indicated by an alarm activated by the SCX. Furthermore, the “PS” LED of the SAX component will be switched on.

Rear View

Table 3-1 provides the rear view of an SRX10 chassis.

NOTE: Both, the AC sockets and DC supplies are accessible from the back side of the chassis.

Table 3-1 Rear Views of the SRX10

Rear View	Description
	SRX equipped with fan module (two fans) and integrated alarm out card.

NOTE: Fan module and alarm out card must be ordered separately. Refer to Table 1-2 on page 1-6 for order information.

Modules and Line-Cards

Into the chassis can be inserted:

- 10x line-cards
- 1x axMSP Agent (SCX2e)
- 2x local power supplies (SPX; AC and /or DC type)
- 1x alarm & fan unit

NOTE: The air flow concept requires closed card slots. Always mount cover plates on empty slots to avoid local increase of temperature.

All components are hot-swappable and can be replaced while power is applied to the system.

Some components might be equipped with EMC springs at the edges of the front panels. These springs have sharp edges. Be careful not to cut yourself on these edges.

The fiber optic components of the SRX10 are fragile. Never use any added force to remove or install a component in the SRX10. Always plug in and remove optical connectors gently. Apply force along the axis of the optical connector only. Never apply force across the axis of the optical connector.

Take a careful look at the fiber optic connectors of the components. Various connector types exist which have to be handled differently. Never apply excessive force. A plug may fail to connect to the jack for various reasons. For example, the plug may have a notch that has to be aligned prior to insertion.

Installation and Removal of Line-Cards

Tools Required: A medium Phillips head screwdriver, Fiber Optic Cleaning Kit, optic power meter, and microscope are required for this procedure.

CAUTION: Gently remove/install the fiber optic cabling. Do not bend the cables!



CAUTION: Laser Class 1. Do not look into the fiber optic output. Looking into the fiber optic output can cause injury to the eye. When observation is necessary optical power must be removed from the cable or eye protection must be worn and precautions must be taken to avoid exceeding the limits recommended in ANSI Z136.1-1981. If it is unclear whether or not the fiber optic cable is carrying an optical signal, use a reliable optic power meter to verify the absence of optical power. Use only a tested and calibrated power meter.



WARNING: Although real fiber optic WDM modules are passive and do not contain sensible electronic parts attach a wrist strap and follow ESD procedures during the handling of all components.

Insertion of axMSP Line-Cards

arcutronix does offer two types of line-cards: The classic type and the standard type. The two types differ in the way how the front-plate is mounted with respect to the main-board.

SRX chassis is made to house standard as well as classic type line-cards. Even a mixture of the types is possible, but one slot is getting lost for adaptation.

The next table (Table 3-2) gives an overview how to place the adaptor plate for different devices (arcutronix and PDT).

Table 3-2 Matrix for classic and standard type line-cards

Mech. Type	arcutronix		PDT	
Standard	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	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

Inserting Standard Line-Cards, only

Figure 3-2 shows the configuration, when 10 standard line-cards are placed in a SRX10. No change is needed to fit.

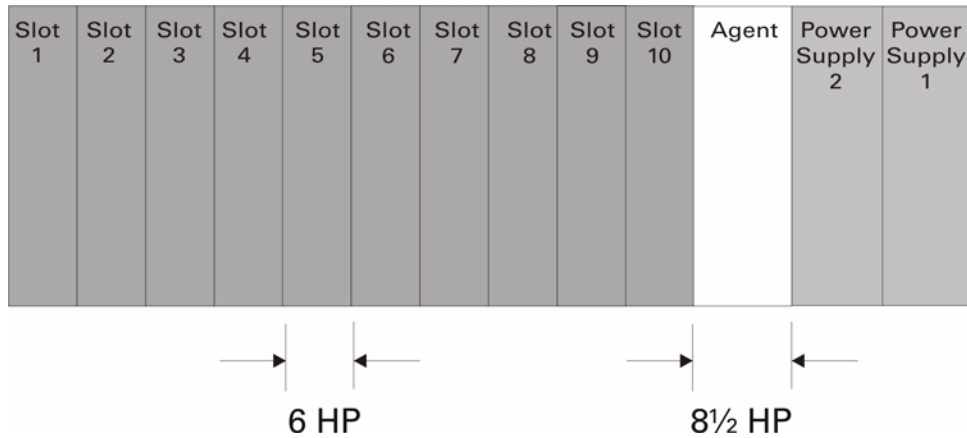


Figure 3-2 SRX10: Inserting axMSP standard Line-Cards

Inserting Classic Line-Cards, only

As the classic line-cards do have a slightly different front side, a quick adaptation is needed to fit the SRX10. An adapter plate has to be mounted on the inner left side of the chassis.

The adapter plate is part of your delivery (see Figure 3-3). For the mounting a Phillips screwdriver size 1 is needed.

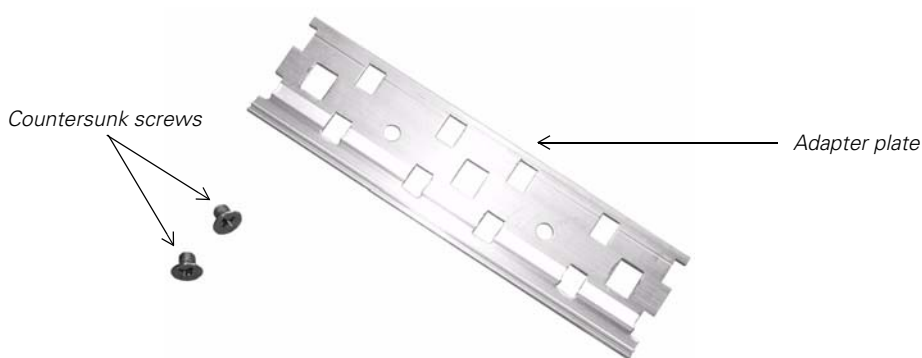


Figure 3-3 Adapter Plate Kit

Figure 3-4 shows the configuration, when 10 classic line-cards are placed in a SRX10. As the classic line-cards do not have management support, no agent card is available in this case.

The adapter plate is shown on the left side of the chassis.

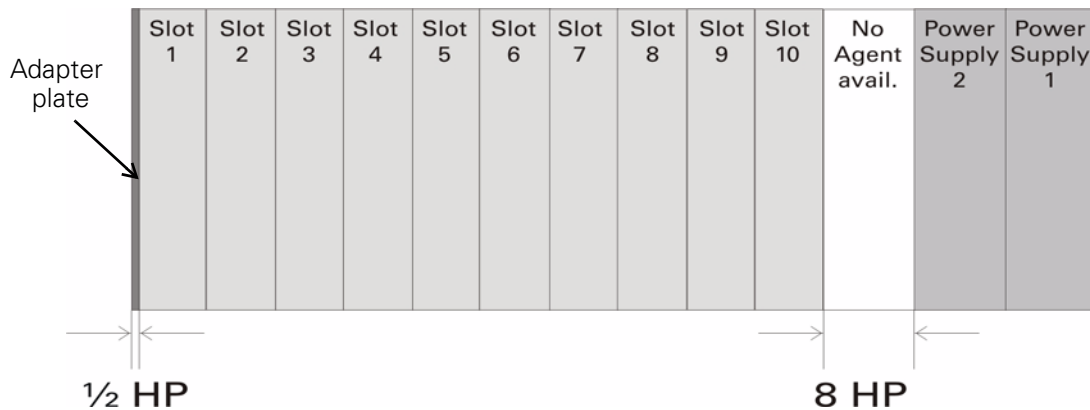


Figure 3-4 SRX10: Inserting axMSP classic Line-Cards

Mixing Line-Cards of Both System Types

As the classic line-cards do have a slightly different front side, a quick adaptation is needed to fit the SRX10. An adapter plate has to be mounted on the inner left side of the chassis. The adapter plate is part of your delivery (see Figure 3-3). For the mounting a Phillips screwdriver size 1 is needed.

All the classic line-cards have to be mounted on the left side of the chassis, close to the adaptor plate. As the front-plate of classic and standard are not compatible, one slot has to be left unused and then the standard line-cards are mounted.

NOTE: Group classic and standard line-cards to avoid unnecessary waste of rack-space.

Figure 3-5 shows the configuration, when 4 classic line-cards and 5 standard line-cards are placed in a SRX10. As the classic line-cards do not have management support, only agent card is available.

The adapter plate is shown on the left side of the chassis.

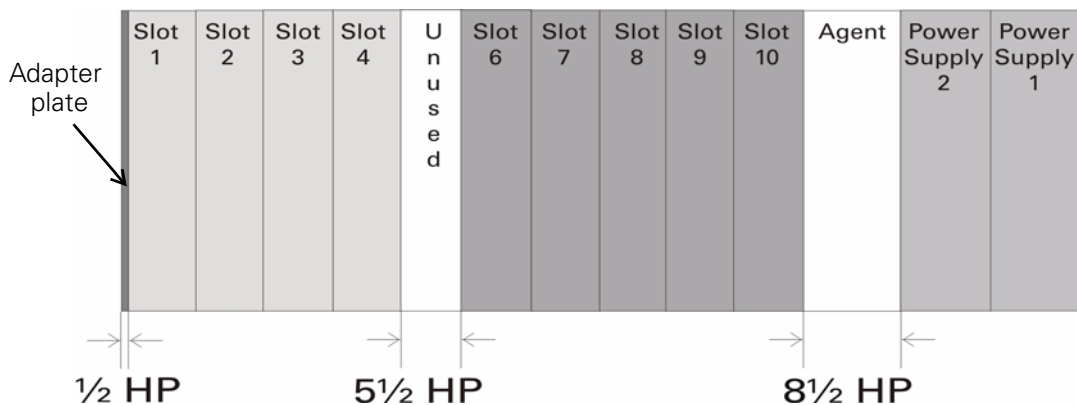


Figure 3-5 SRX10: Inserting axMSP classic and standard Line-Cards

The following table gives an overview of the possible part combinations.

Table 3-3 Possible Part Combinations

Part	axMSP standard only	axMSP classic only	Mixed systems
Number of usable slots	10	10	9
Power Supply	2	2	2
axMSP Agent (SCX)	1	1	1
Fan & Alarm Module (SAX)	1	1	1
Adapter Plate		left	left

Power Supply Unit (Local Power)

NOTE: The power supplies must be ordered separately.

Two power supply units can be mounted into the chassis. The handles allow easier placement and mounting in the special power slots.

Each power supply of the SRX chassis features a green 'POWER' LED indicator. This indicator is lit when the unit is operational. The power supply is also monitored by the SCX2e and the SAX card. The SNMP management initiates an alarm if a power supply or a power feed fails.

Power Components

Each power supply is connected to one mains jack ("AC-Power Connection" on page 2-4) or the DC jack on the rear ("DC-Power Connection" on page 2-6). Each mains jack has its own power cord. For redundancy use a separate power receptacle for each power cord.

The power supplies have an inrush current which exceeds the current occurring during normal operation. It is recommended that you develop a switch-on sequence for the equipment if you are using large applications. Switching on all the equipment simultaneously can cause a power overload. An overload condition is dangerous for uninterrupted power supplies and can cause fuses to blow. Table 3-4 illustrates the location of the fuses for the AC power supply (2.5 A T fuses). Table 3-5 illustrates the location of the fuses for the DC power supply (4 A T fuses) of the SRX chassis.

Power Precautions

WARNING:

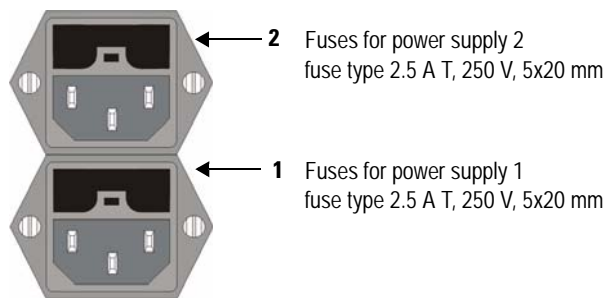
- Disconnect the power cord before opening the device.
- Always plug the power cords into properly grounded receptacles. An improperly wired receptacle could place hazardous voltage on the accessible metal parts of the device.

- 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.

AC Sockets and Fuse Holder

The AC socket contains two mains fuses to protect both line wires. To replace blown fuses follow the procedure described below.

Table 3-4 AC Connectors and Fuses



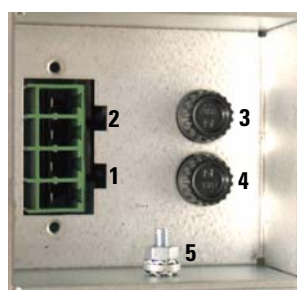
AC-Fuse Replacement

Press the lever in the middle of the fuse box down and pull the fuse holder out. To insert the replaced fuses push the fuse box into the socket until the lever clicks.

DC Dual Power Feed Unit

Table 3-5 illustrates the DC power feed unit of the SRX10 chassis.

Table 3-5 DC Power Feed Unit



- | | |
|---|---|
| 1 | DC input 1 (power supply #1) |
| 2 | DC input 2 (power supply #2) |
| 3 | Fuse 2, Wickmanntype 19195 |
| 4 | Fuse 1, Wickmanntype 19195 |
| 5 | Grounding bolt
For improved lightning protection connect this grounding bolt to ground. Use min. 2.5 mm ² (AWG 13) for the ground wire. Fasten the screw! |

DC-Fuse Replacement

To replace the DC-fuse, just open the cap (screwtop). Use a fuse, as written in the technical specifications.

Installation Procedure for a Power Supply

Before you install the power supply, make sure that you have the correct supply.

Use the following procedure to install a power supply to the SRX chassis:



WARNING: Attach a wrist strap and follow ESD procedures during the handling of all electronic components.

Tools Required: A medium Phillips head screwdriver is required for the SRX chassis.

1. Insert the power supply into place.
2. Using the screwdriver, secure the 4 self-retaining screws in the corners of the power supply's front panel.

Removal Procedure for a Power Supply

Use the following procedure to remove a power supply from the SRX chassis:



WARNING: Attach a wrist strap and follow ESD procedures during the handling of all electronic components.

CAUTION: The SRX10 chassis has two power supplies. Do not remove more than one power supply from the SRX chassis at the same time to avoid a power loss on your system that will interrupt all data communication.

Tools Required: A medium Phillips head screwdriver is required for the SRX10 chassis.

NOTE: You do not need to remove power from the system to perform this procedure.

1. Using the screwdriver, loosen the 4 self-retaining screws in the corners of the power supply's front panel until you can feel that the screws have left the thread.
2. Slide the power supply out of the chassis.



WARNING: The surface of the power supply may be hot from operation. Use a cloth to protect your skin from burns.

3. Place the removed power supply into an anti-static container.

NOTE: The air flow concept requires closed card slots. Always mount cover plates on empty slots to avoid local increase of temperature.

Fan & Alarm Module

NOTE: The fan & alarm module must be ordered separately.

The fan and alarm module is equipped with an Alarm Out unit. This unit monitors the function of the fan itself, the power supplies and the power management as well as line-cards.

If there is a failure recognized by the unit an alarm is set. An alarm is indicated locally by a red LED.

Table 3-6 Fan Module Indicators

Fan Module



Indicator	Indicator Color	Description
FAN	Red	Signals an alarm caused by an under-run of the mandatory rotational frequency of the fan.
LINE	Red	This alarm is initiated by one or several line-cards, if the alarm parameters selected by the user are fulfilled.
PS	Red	Signals an alarm caused by the power supply system. There are two reasons why an alarm might be initialized: 1. An under-run of the required voltage of one power supply. Note: An alarm will only be initialized if the power supplies are installed in the chassis. (E.g, if PS1 and PS2 are installed and PS2 will be removed, the alarm relay won't be activated. 2. An overrun of the allowed power budget of the chassis.
CMS	Red	This alarm is initiated by the main agent, if the alarm parameters selected by the user, are fulfilled.

Fan Placement

The optional fan & alarm module of the SRX10 chassis is equipped with two fans. In case of a defect in one fan temporary the other fan is sufficient to cool the system. The defective module has to be replaced as soon as possible.



NOTE: The air flow concept requires closed card slots. Always mount cover plates on empty slots to avoid local increase of temperature.

Alarm Connector

An alarm connector is used in order to indicate different alarms of the chassis.

Table 3-7 shows the four alarm connector settings.

Table 3-7 Pin assignment Alarm Connector

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

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

NOTE: If the chassis is not powered up, the alarm connections are in "Alarm" state.

Replacement Procedure for a Fan & Alarm Module

Use the following procedure to replace a fan module in the SRX10 chassis:

WARNING: Attach a wrist strap and follow ESD procedures during the handling of all electronic components.



Tools Required: A medium Phillips head screwdriver is required for this procedure.

1. Remove the electrical cabling from the alarm out port(s) if they are connected.
2. Using the screwdriver loosen the 6 screws on the fan module and remove them.
3. Carefully slide the fan module out from the chassis.
4. Place the removed fan module in an anti-static container and set it aside.
5. Remove the new fan module from its anti-static container.
6. Carefully place the new fan module in the chassis. Ensure that the orientation of the fan module is correct.
7. Using the screwdriver, secure the 6 self-retaining screws.
8. Connect the electrical cabling to the alarm out ports.

Chapter 4

SRX10-RF Chassis

This chapter provides information on the components and configurations of the SRX10-RF chassis.

SRX10-RF Chassis

The SRX10-RF chassis is capable to provide Remote Feeding voltage to all the 10 line-card slots. It can house a special power supply, which is generating the Remote Feeding voltage out of the DC power supply, which is available in Central Office installation. The SRX10-RF chassis can be equipped with up to ten line-cards, one agent (SCX2e) and two power supplies (SPX) from the front side and with a alarm/fan module from the rear side.

NOTE: As a pure CO installation unit, the SRX10-RF does only work with DC power supply. This is true for the Remote Feeding unit as well the local power supply for the installed modules.

With SCX2e System Controller Card several management opportunities are possible like SNMP, ssh, web-based management to monitor and configure the entire system local and remote.

Front View

The front view of the SRX10-RF chassis in Figure 4-1 illustrates the placement of the cards.

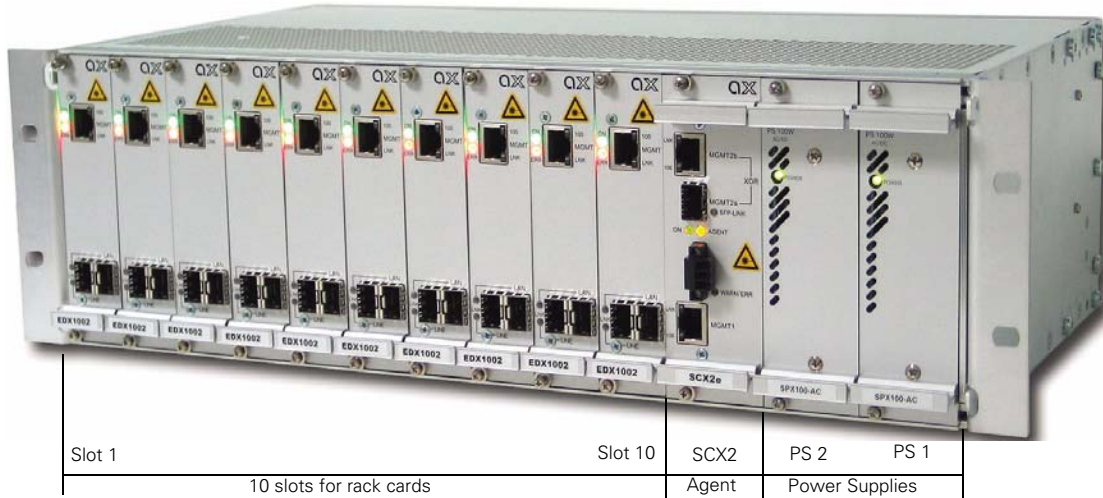


Figure 4-1 Front View of an Equipped SRX10-RF Chassis

The ten slots for line-cards (LC), the SCX card, and two power supplies are accessible from the front side. The line cabling, fiber optic or copper, is also attached at the front side of the system.

Power Management

The intelligent SRX10-RF power management is a power share bus indicating the available power left to feed the rack mount cards. This allows an effective utilization of the power supply capabilities.

The chassis has its specific power to feed the rack mount cards. This power depends on the capabilities of the power supply device used. The remaining power of the chassis will be reduced by each inserted unit. The SRX10-RF has an integrated power management unit, which signals the remaining power after a card has been inserted.



Read the following descriptions of the SRX10-RF power management and the management rules carefully, before inserting any equipment into the SRX!

Power Management Rules

- If the whole system is powered up, cards with priority status will be switched on first. Cards with priority status are alarm and fan cards and rack mount cards of the backward compatible System 2100. Next in the hierarchy of priority are the agents, at last the rack mount cards in slot 1, 2, 3, etc. The system analyzes automatically, if there is enough power left to feed the units.

NOTE: It is mandatory to remove a card which has been rejected by the power management.

- If the remaining power is not sufficient, the SRX10 unit, e.g. agent or modem card, will not be powered up. There is one exception: Cards with priority status will always be switched on!

The decision if a unit will be powered up or not will be taken:

1. if a new card is inserted into the SRX or
2. if the whole system is powered up.

Once taken, this decision will not be revised!

NOTE: Violation of the rules can cause overloads in the power management. Such a failure will be indicated by an alarm activated by the SCX. Furthermore, the “PS” LED of the SAX component will be switched on.

Rear View

Table 4-1 provides the rear view of an SRX10-RF chassis.

NOTE: The DC supplies are accessible from the back side of the chassis.

Table 4-1 Rear Views of the SRX10-RF

Rear View	Description
	SRX10 equipped with fan module (two fans) and integrated alarm out card.

NOTE: Fan module and alarm out card must be ordered separately. Refer to Table 1-2 on page 1-6 for order information.

Modules and Line-Cards

Into the chassis can be inserted:

- 10x line-cards
- 1x axMSP Agent (SCX2e)
- 1x local power supply (SPX100-DC)
- 1x remote power supply (SPX200-DC-RF)
- 1x alarm & fan unit

NOTE: The air flow concept requires closed card slots. Always mount cover plates on empty slots to avoid local increase of temperature.

All components are hot-swappable and can be replaced while power is applied to the system.

Some components might be equipped with EMC springs at the edges of the front panels. These springs have sharp edges. Be careful not to cut yourself on these edges.

The fiber optic components of the SRX10-10 are fragile. Never use any added force to remove or install a component in the SRX10. Always plug in and remove optical connectors gently. Apply force along the axis of the optical connector only. Never apply force across the axis of the optical connector.

Take a careful look at the fiber optic connectors of the components. Various connector types exist which have to be handled differently. Never apply excessive force. A plug may fail to connect to the jack for various reasons. For example, the plug may have a notch that has to be aligned prior to insertion.

Installation and Removal of Line-Cards

Tools Required: A medium Phillips head screwdriver, Fiber Optic Cleaning Kit, optic power meter, and microscope are required for this procedure.

CAUTION: Gently remove/install the fiber optic cabling. Do not bend the cables!



CAUTION: Laser Class 1. Do not look into the fiber optic output. Looking into the fiber optic output can cause injury to the eye. When observation is necessary optical power must be removed from the cable or eye protection must be worn and precautions must be taken to avoid exceeding the limits recommended in ANSI Z136.1-1981. If it is unclear whether or not the fiber optic cable is carrying an optical signal, use a reliable optic power meter to verify the absence of optical power. Use only a tested and calibrated power meter.



WARNING: Although real fiber optic WDM modules are passive and do not contain sensible electronic parts attach a wrist strap and follow ESD procedures during the handling of all components.

Insertion of axMSP Line-Cards

arcutronix does offer two types of line-cards: The classic type and the standard type. The two types differ in the way how the front-plate is mounted with respect to the main-board.

SRX chassis is made to house standard as well as classic type line-cards. Even a mixture of the types is possible, but one slot is getting lost for adaptation.

The next table (Table 4-2) gives an overview how to place the adaptor plate for different devices (arcutronix and PDT).

Table 4-2 Matrix for classic and standard type line-cards

Mech. Type	arcutronix		PDT	
Standard	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	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

Inserting Standard Line-Cards, only

Figure 4-2 shows the configuration, when 10 standard line-cards are placed in a SRX10-RF. No change is needed to fit.

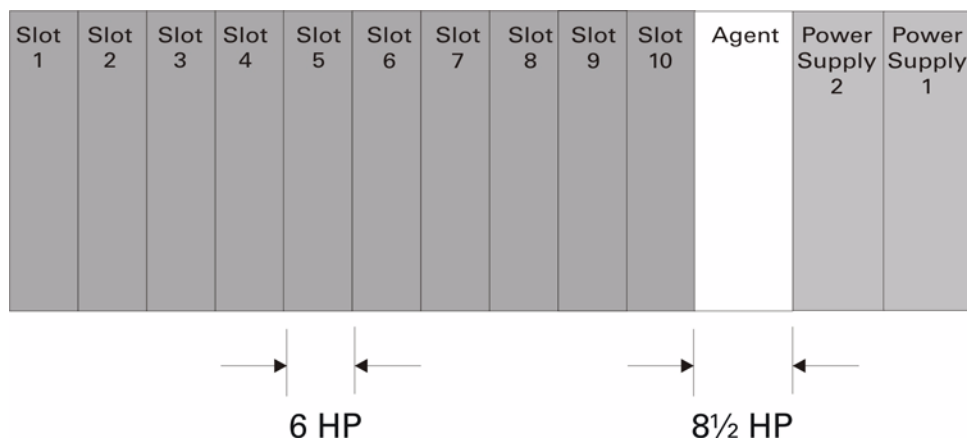


Figure 4-2 SRX10-RF: Inserting axMSP standard Line-Cards

Inserting Classic Line-Cards, only

As the classic line-cards do have a slightly different front side, a quick adaptation is needed to fit the SRX10-RF. An adapter plate has to be mounted on the inner left side of the chassis.

The adapter plate is part of your delivery (see Figure 4-3). For the mounting a Phillips screwdriver size 1 is needed.

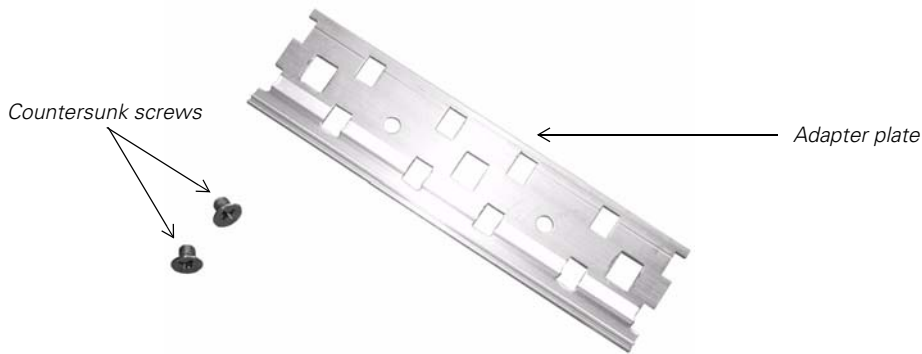


Figure 4-3 Adapter Plate Kit

Figure 4-4 shows the configuration, when 10 classic line-cards are placed in a SRX10-RF. As the classic line-cards do not have management support, no agent card is available in this case.

The adapter plate is shown on the left side of the chassis.

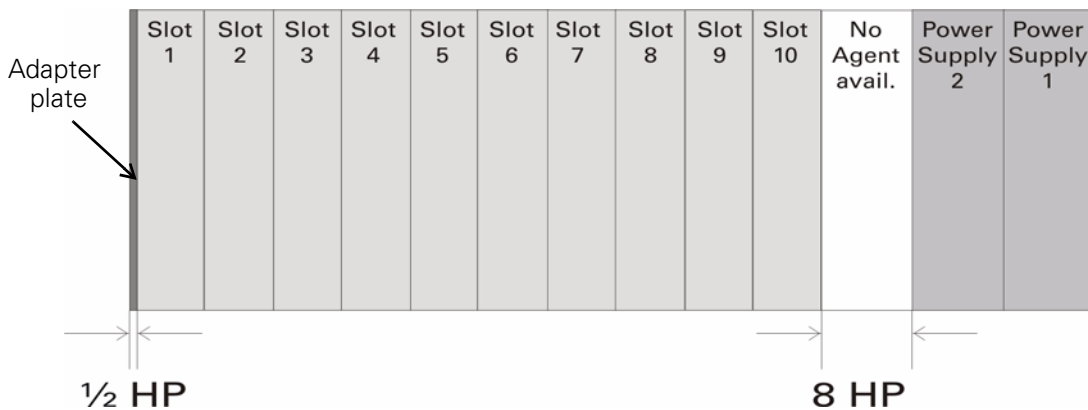


Figure 4-4 SRX10:-RF Inserting axMSP classic Line-Cards

Mixing Line-Cards of Both System Types

As the classic line-cards do have a slightly different front side, a quick adaptation is needed to fit the SRX10. An adapter plate has to be mounted on the inner left side of the chassis. The adapter plate is part of your delivery (see Figure 4-3). For the mounting a Phillips screwdriver size 1 is needed.

All the classic line-cards have to be mounted on the left side of the chassis, close to the adaptor plate. As the front-plate of classic and standard are not compatible, one slot has to be left unused and then the standard line-cards are mounted.

NOTE: Group classic and standard line-cards to avoid unnecessary waste of rack-space.

Figure 4-5 shows the configuration, when 4 classic line-cards and 5 standard line-cards are placed in a SRX10-RF. As the classic line-cards do not have management support, only agent card is available.

The adapter plate is shown on the left side of the chassis.

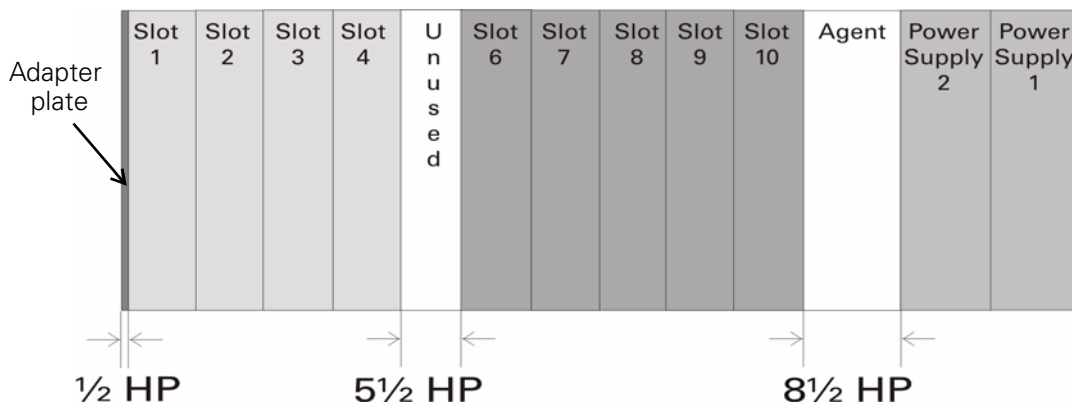


Figure 4-5 SRX10-RF: Inserting axMSP classic and standard Line-Cards

The following table gives an overview of the possible part combinations.

Table 4-3 Possible Part Combinations

Part	axMSP standard only	axMSP classic only	Mixed systems
Number of usable slots	10	10	9
Power Supply	2	2	2
axMSP Agent (SCX)	1	1	1
Fan & Alarm Module (SAX)	1	1	1
Adapter Plate		left	left

Power Supply Units (Local Power and Remote Power)

NOTE: The power supplies must be ordered separately.

The SRX10-RF does support (and need) two different power supply units:

- SPX100-DC: Local Power Supply, which feeds all the plugged Linecards, the agent and the fan-unit. This unit is needed, whether remote feeding is used or not. The SPX100-DC operates at -48...-60VDC input and provides +5VDC to the chassis.
- SPX200-DC-RF: Remote Feeding Power Supply, which generates the remote feeding voltage (190VDC) out of -48...-60VDC input. The RF-voltage is available on all 10 line-card slots. Special “RF-” line-cards (e.g. CSX4-RF) are needed to grip the voltage from the backplane and put it onto the line.

These two power supply units can be mounted into the chassis. The local power supply (SPX100-DC) must be mounted into the most right slot (called “PS1”), while the remote

feeding power supply SPX200-DC-RF must be mounted into the next left slot (“PS2”). There is no restriction for the sequence of insertion.

Each power supply of the SRX chassis features a green ‘POWER’ LED indicator. This indicator is lit when the unit is operational. The power supplies are also monitored by the SCX2e and the SAX card. The SNMP management initiates an alarm if a power supply or a power feed fails.

Power Components

Each power supply is connected to DC jack on the rear (“DC-Power Connection” on page 2-6).

The power supplies have an inrush current which exceeds the current occurring during normal operation. It is recommended that you develop a switch-on sequence for the equipment if you are using large applications. Switching on all the equipment simultaneously can cause a power overload. An overload condition is dangerous for uninterrupted power supplies and can cause fuses to blow. Table 4-4 illustrates the location of the fuses for the DC power supply (4 A T fuses) of the SRX10-RF chassis.

Power Precautions

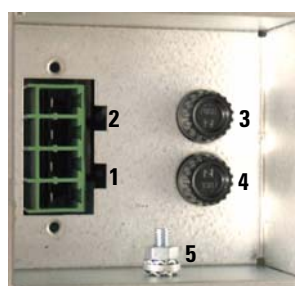
WARNING:

- 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 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.

DC Dual Power Feed Unit

Table 4-4 illustrates the DC power feed unit of the SRX10 chassis.

Table 4-4 DC Power Feed Unit



- | | |
|---|---|
| 1 | DC input 1 (power supply #1) |
| 2 | DC input 2 (power supply #2) |
| 3 | Fuse 2, Wickmanntype 19195 |
| 4 | Fuse 1, Wickmanntype 19195 |
| 5 | Grounding bolt
For improved lightning protection connect this grounding bolt to ground. Use min. 2.5 mm ² (AWG 13) for the ground wire. Fasten the screw! |

DC-Fuse Replacement

To replace the DC-fuse, just open the cap (screwtop). Use a fuse, as written in the technical specifications.

Installation Procedure for a Power Supply

Before you install the power supply, make sure that you have the correct supply.

Use the following procedure to install a power supply to the SRX chassis:



WARNING: Attach a wrist strap and follow ESD procedures during the handling of all electronic components.

Tools Required: A medium Phillips head screwdriver is required for the SRX chassis.

1. Insert the power supply into place.
2. Using the screwdriver, secure the 4 self-retaining screws in the corners of the power supply's front panel.

Removal Procedure for a Power Supply

Use the following procedure to remove a power supply from the SRX chassis:



WARNING: Attach a wrist strap and follow ESD procedures during the handling of all electronic components.

CAUTION: The SRX10-RF chassis has two power supplies. Do not remove more than one power supply from the SRX chassis at the same time to avoid a power loss on your system that will interrupt all data communication.

Tools Required: A medium Phillips head screwdriver is required for the SRX10-RF chassis.

NOTE: You do not need to remove power from the system to perform this procedure.

1. Using the screwdriver, loosen the 4 self-retaining screws in the corners of the power supply's front panel until you can feel that the screws have left the thread.
2. Slide the power supply out of the chassis.



WARNING: The surface of the power supply may be hot from operation. Use a cloth to protect your skin from burns.

3. Place the removed power supply into an anti-static container.

NOTE: The air flow concept requires closed card slots. Always mount cover plates on empty slots to avoid local increase of temperature.

Appendix A

Technical Information

Technical Specifications

SRX - System Rack

Table A-1 shows the physical data of the SRX - System Rack.

Table A-1 Physical Dimensions

Parameter	SRX10	SRX10-RF
Physical dimensions:		
Height (inclusive rubber feet)	133.35 mm (3U)	133.35 mm (3U)
Width	482.6 mm	482.6 mm
Depth	390 mm	390 mm
Required clearance	100 mm for front cabling	100 mm for front cabling
Weight	3.5 kg ⁱ	3.5 kg ⁱ
Environmental conditions:		
Temperature (operation)	+5 ... +40 °C	+5 ... +40 °C
Temperature (storage)	-30 ... +80 °C	-30 ... +80 °C
Humidity	10 ... 90%, non-cond.	10 ... 90%, non-cond.
Ingress Protection:		
Rack-Mounted	IP20	IP20

i. Represents the weight of an unequipped chassis.

SPX - System Power

Local System Power

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

Table A-2 *Electrical Specifications*

Parameter	SPX100-AC	SPX100-DC
Supply voltage	110/240 V AC $\pm 10\%$,	48...72 V DC ⁱ
Frequency	50 Hz	
Supply current	< 2.0 A	< 3.5 A
Inrush current	< 10 A	< 10 A
Output	5 V DC / 20 A	5 V DC / 20 A
Fuse, type	T2.5A; 250V; 5x20	4 A T (Wickmantype 19195)

i. -10% / +10%

NOTE: The fuses are part of the System Rack SRX and can be found there.

Table A-3 provides the physical data of the SPX - System Power Supplies.

Table A-3 *Physical Dimensions SPX*

Parameter	SPX100-AC	SPX100-DC
Physical dimensions:		
Height (inclusive rubber feet)	133.35 mm (3U)	133.35 mm (3U)
Width	40.64 mm (8 HP)	40.64 mm (8 HP)
Depth	390 mm)	390 mm)
Weight	0.6 kg	0.6 kg
Environmental conditions:		
Temperature (operation)	+5 ... +40 °C	+5 ... +40 °C
Temperature (storage)	-30 ... +80 °C	-30 ... +80 °C
Humidity	10 ... 90%, non-cond.	10 ... 90%, non-cond.

Remote System Power

NOTE: The Remote system Power components (SPX200-DC-RF) can only be mounted into the SRX10-RF! It must always be mounted in the secondary slot to the left (called PS2).

Table A-4 provides an overview of the electrical specifications of the System Power Supplies.

Table A-4 *Electrical Specifications*

Parameter	SPX200-DC-RF
Supply voltage	48...72 V DC ⁱ
Frequency	
Supply current	< 6 A
Inrush current	< 10 A
Output	190 V DC/ 1.0 A
Fuse, type	4 A T (Wickmantype 19195)

i. -10% / +10%

NOTE: The fuses are part of the System Rack SRX10 and can be found there.

Table A-3 provides the physical data of the SPX - System Power Supplies.

Table A-5 *Physical Dimensions SPX*

Parameter	SPX200-DC-RF
Physical dimensions:	
Height (inclusive rubber feet)	133.35 mm (3U)
Width	40.64 mm (8 HP)
Depth	390 mm)
Weight	0.6 kg
Environmental conditions:	
Temperature (operation)	+5 ... +40 °C
Temperature (storage)	-30 ... +80 °C
Humidity	10 ... 90%, non-cond.

SAX - System Alarm and Fan

Table A-6 provides the physical data of the SAX - System Alarm and Fan Card.

Table A-6 More Specifications

Parameter	SAX24
Physical dimensions:	
Height (inclusive rubber feet)	133.35 mm (3U)
Width	40.64 mm (8 HP)
Depth	390 mm)
Weight	0.6 kg
Environmental conditions:	
Temperature (operation)	+5 ... +40 °C
Temperature (storage)	-30 ... +80 °C
Humidity	10 ... 90%, non-cond.

Table A-7 shows additional specifications for SRX.

Table A-7 More SAX Specifications

Parameter	SAX24
Fan	2 x 12V-fan
Rotation Speed (RPM)	1800
Airflow (m ³ /h)	63
Acoustic Noise (dB/A)	22
Input Power	1.2 W (total 2.5 W)
Alarm Connector	4 x RIA (3 pin)

Appendix CE EC Conformity Declaration



Declaration of EC-Conformity

We arcutronix GmbH
Garbsener Landstr. 10
D – 30419 Hannover
Germany

declare under our sole responsibility that the product group

Name: SRX – System Rack
Members: SRX10
Number: 0805-9000

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

89/336/EEC Electromagnetic compatibility
73/23/EEC Safety of low voltage equipment
1999/5/EC Radiocommunication & Telecommunication Terminal Equipment
93/68/EEC CE marking

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, 25.09.2009

Andreas Zimmermann
TD arcutronix GmbH

arcutronix GmbH ☺ Garbsener Landstr. 10 ☺ D-30419 Hannover ☺ Germany

Headquarter

arcutronix GmbH
Garbsener Landstrasse 10
30419 Hannover
Germany

Phone: +49 (511) 277 2700
Fax: +49 (511) 277 2709
EMAIL: info@arcutronix.com
www.arcutronix.com