# Documentation

## HiPath 4000 V5
## Initial Installation/Startup

Installation Instructions

A31003-H3150-J100-1-7631

Communication for the open minded

Siemens Enterprise Communications
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## Communication for the open minded

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Reference No.: A31003-H3150-J100-1-7631

# Contents

# 1 Introduction and Important Notes

Notes for the Editor:

- Modify Sections 1.1 to 1.3 to reflect the product or manual.
- Section 1.4 ("Safety Information and Warnings") contains standard texts relating to safety. They apply equally to all manuals.
- Additional information on observing standards and guidelines that cannot be included in the section on general safety information and warnings can be entered in section 1.8. For example, this can include additional product-, application- or country-specific information.
- After you have completed the section, delete all text marked in red.

## 1.1 Product Overview

The Product and Its Applications

## 1.2 Target Group and Requirements

Audience and Required Courses

## 1.3 Using this Manual

### 1.3.1 Manual Structure

Here you will find the names of the different sections and a brief description of their contents.

This section may be omitted, depending on the manual length and requirements.

### 1.3.2 Reference Manuals

This section contains the titles and part numbers of the other manuals relating to the product.

## 1.3.3 Notational Conventions Used

This manual uses the following notational conventions:
We do not yet have a fully established standard set of notational conventions. As a result, please write down the meaning of the fonts as they appear in your manual. For example:

| Purpose | Style | Example |
|---|---|---|
| Special emphasis | Boldface | **Name** must not be deleted. |
| User interface elements | Boldface | Click **OK**. |
| Menu sequence | > | **File > Close** |
| Textual cross-references | Italics | For more information, see *Network*. |
| Output | Font with a fixed width such as Courier | `Command not found.` |
| Input | Font with a fixed width such as Courier | Enter `LOCAL` as the file name. |
| Key combinations | Font with a fixed width such as Courier | `<CTRL>+<ALT>+<ESC>` |
| Steps and subordinate steps in instructions | Numbered lists (using numbers and letters) | 1. Set up the DSL telephony subscriber with the corresponding extension number.<br>a) Click **Add**.<br>b) In **DSL Telephony Subscriber**, enter the name of the DSL telephony subscriber. |
| Options in instructions | Bulleted list | • If you want to output amounts, select the **Output Amounts, Not Units** checkbox.<br>• If you want to output units, deselect the **Output Amounts, Not Units** checkbox. |

***IMPORTANT:*** Identifies useful information.

## 1.4 Safety Information and Warnings

Work on communication systems and devices may **only** be carried out by qualified persons.

For the purposes of safety information and warnings, qualified persons are persons who are authorized to place into operation, ground, and label systems, devices, and lines in accordance with applicable safety procedures and standards.

It is absolutely essential that you read and understand the following safety information and warnings before starting installation and implementation work on the communication system or device.

You should also carefully read and observe all safety information and warnings on the communication systems and devices themselves.

Familiarize yourself with emergency numbers.

Always consult your manager before starting work in conditions where the necessary safety precautions do not appear to be in place.

### Types of safety information and warnings

The following grades of safety information/warnings are used in this manual:

**DANGER**

Indicates an immediate danger that could result in death or serious injury.

**WARNING**

Indicates a general danger that could result in death or serious injury.

**CAUTION**

Indicates a danger that could result in injury.

***NOTE:*** Indicates situations that could result in damage to property and/or loss of data.

### Symbols for specifying the source of danger more exactly

The following symbols are not usually used in the manual. They explain symbols that may be depicted on the communication systems and equipment.


* elektrostatisch gefährdete Bauelemente

## 1.4.1 Warning Sign: Danger

**DANGER**

**Risk of electric shock through contact with live wires**

- Note: Voltages above 30 Vac (alternating current) or 60 Vdc (direct current) are dangerous.
- Only personnel with proper qualifications or qualified electricians should perform work on the low-voltage network (<1000 Vac) and all work must satisfy national/local requirements for electric connectors.

## 1.4.2 Warning Sign: Warning

**WARNING**

**Risk of electric shock through contact with live wires**

An electric shock can be life-threatening or lead to serious injuries such as burns.

There are additional dangers even when working with low voltage and large cable cross-sections. Cables with a large cross-section generally have lower voltages, although the amperages are higher.

- Before starting any work, check that the circuits involved are de-energized. Never take it for granted that turning off a main switch or circuit breaker will reliably interrupt all circuits.
- Only use systems, tools, and equipment which are in perfect condition. Do not use equipment with visible damage.
- Replace any damaged safety equipment (covers, labels and ground wires) immediately.
- Replace the power cable immediately if you notice any damage.
- Only place systems or devices in protection class I into operation using a ground contact socket.
- Connect the communication system and, if necessary, the main distribution frame to the ground wire before starting up the system and connecting telephones and lines. Never operate the communication system without the required ground wire.
- Never touch live wires without ensuring adequate insulation.
- Do not carry out any hardware installation work on communication systems and devices during a storm.
- Expect leakage current from the communications network. Disconnect all communication lines from the system before disconnecting the prescribed ground wire from the system.

**WARNING**

**Disconnection from power circuit(s)**

A disconnect device can be a disconnecting switch (main switch), circuit breaker (fuse/cutout), or power plug that completely disconnects the communication system and device from the power circuit.

- Before carrying out any work on the communication system or on the device, find out whether there is a disconnect device and locate it.
- When you need to disconnect the power supply to the communication system or device, you do so using the disconnect device.
- Secure the disconnect device mechanically so that it cannot be used by other persons and attach a sign reading DO NOT OPERATE to the disconnect device.
- Disconnect all power supply circuits if the communication system's power supply unit is not needed for certain work (for example, when changing cables).
  Disconnect the communication system's power plug and ensure that the communication system or device is not powered from an additional power source (for example, an uninterruptible power supply), or that it is protected by an additional fuse or an additional main switch.
- If you are performing work on circuits with hazardous voltages, always work together with a partner who is familiar with the location of the disconnect devices for the power supplies.
- Always disconnect the power supply when you are working directly next to a power supply unit or direct current converter, unless the work instructions expressly permit you to work without disconnecting the power supply.
- As long as the power supply is switched on, always observe the greatest caution when performing measurements on powered components and maintenance work on plug-in cards, PC boards and covers.
- Metallic surfaces such as mirrors are conductive. If you touch them, there is a risk of electric shocks or short circuits.

## 1.4.3 Warning Sign: Caution

**CAUTION**

**Danger of injury:**

- When working on an open communication system or device, make sure that it is never left unattended.
- Risk of injury resulting from heavy items or loads.
  Lifting heavy objects/loads can cause injury. Use appropriate aids to carry out such tasks.
- Risk of injury resulting from laser radiation.
  If there are any optical interfaces: In case of laser radiation,
  do not look directly into the beam. You could damage your eyes.

**CAUTION**

**Risk of explosion if accumulators and batteries are not changed properly:**

- Only use licensed battery packs and batteries.
- The lithium battery must be replaced only by an identical battery or one recommended by the manufacturer.

**CAUTION**

**Risk of fire:**

- Only communications cables with a cable diameter of at least 0.4 mm (AWG 26) or larger may be used.
- The system cabinets must not be fitted with any third-party devices that have not been approved.
- Do not store any documents or similar flammable items in the system.

**CAUTION**

**General risk of injury/accidents in the workplace:**

- When maintenance work has been completed, always re-install all safety equipment in the right place. Also close all doors, covers, or the housing after completing test and maintenance work.
- Lay cables so as to prevent any risk of them being damaged or causing accidents, such as tripping.
- Make sure that the work area is well lit and tidy.
- When working on the communication system, never wear loose clothing and always tie back long hair.
- Do not wear jewelry, metal watchbands or clothes with metal ornaments or rivets. There is a risk of injury and short circuits.
- Always wear the necessary eye protection whenever appropriate.
- Always wear a hard hat where there is a risk of injury from falling objects.
- Check your tools regularly. Only use intact tools.

## 1.4.4 Important Information

Note the following information in order to avoid damage to property:

- Before placing the system into operation, check whether the nominal voltage of the power supply network corresponds to the nominal voltage of the communication system or device (type plate). If necessary, adjust the nominal voltage of the communication system or device appropriately.
- Protection of electrostatically sensitive devices (ESD):
  - Always wear the wristband in the prescribed manner before performing any work on PC boards and modules.
  - Transport PC boards and modules only in suitable protective packaging.
  - Always place PC boards and modules on a grounded conductive base, and do not work on the PC boards anywhere else.
  - Only use grounded soldering irons.
- Use only original accessories. Failure to comply with this safety information may damage the communication system or violate safety and EMC regulations.
- Before starting wall assembly, check that the load-bearing capacity of the wall is adequate, Always use suitable installation and fixing material to make sure that the communication system is mounted safely.
- Condensation damage:
  If the temperature changes rapidly, air humidity can precipitate. If the communication system or device is moved from a colder to a warmer environment, moisture can precipitate. Wait until the temperature has adjusted to the ambient temperature and the communication system or device is completely dry before starting it up.
- If there is no emergency power supply available or if switchover to analog emergency phones is not possible during a power failure, no more emergency calls can be made via the communication system if the power supply unit fails.

## 1.5 Emergencies

### What to do in an emergency

- In the event of an accident, remain calm and controlled.
- Always switch off the power supply before you touch an accident victim.
- If you are not able to immediately switch off the power supply, only touch the victim with non-conductive materials (such as a wooden broom handle), and first of all try to isolate the victim from the power supply.

### First aid

- Be familiar with basic first aid procedures for electrical shock. A fundamental knowledge of the various resuscitation methods if the victim has stopped breathing or if the victim's heart is no longer beating, as well as first aid for treating burns, is absolutely necessary in such emergencies.
- If the victim is not breathing, immediately perform mouth-to-mouth or mouth-to-nose resuscitation.
- If you have appropriate training, immediately perform heart massage if the victim's heart is not beating.

### Calling for help

- Immediately call an ambulance or an emergency physician. Provide the following information in the following sequence:
  - Where did the accident happen?
  - What happened?
  - How many people were injured?
  - What type of injuries?
  - Wait for questions.

## 1.6 Reporting Accidents

- Immediately report all accidents, near accidents and potential sources of danger to your manager.
- Report all electric shocks, no matter how small.

## 1.7 Normal Use

The communication system may only be used for the applications described in this documentation and only in conjunction with add-on devices and components recommended and approved by
Siemens Enterprise Communications GmbH & Co. KG.
The prerequisites for the normal use of the communication system include appropriate transport, storage, installation and startup as well as meticulous operation and maintenance.

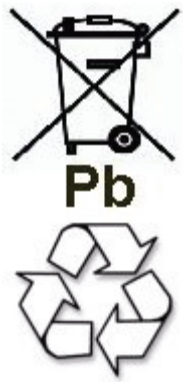
## 1.8 Proper Disposal and Recycling

All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.

The correct disposal and separate collection of your old appliance will help prevent potential negative consequences for the environment and human health. It is a precondition for reuse and recycling of used electrical and electronic equipment.

For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service, the shop where you purchased the product or your sales representative.

The statements quoted above are only fully valid for equipment which is installed and sold in the countries of the European Union and is covered by the directive 2002/96/EC. Countries outside the European Union may have other regulations regarding the disposal of electrical and electronic equipment.




Used accumulators and batteries with this sign are valuable economic goods and must be recycled. Used accumulators and batteries that are not recycled must be disposed of as hazardous waste with full observance of all regulations.

# 1.9 Standards and Guidelines on Installation

## 1.9.1 Connection to the Power Supply

HiPath communication systems are approved for connection to TN-S power supply systems. They can also be connected to a TN-C-S power supply system in which the PEN conductor is divided into a ground wire and a neutral wire. TN-S and TN-C-S systems are defined in the IEC 364-3 standard.

If work on the low-voltage network is required, it must be carried out by a qualified electrician. The installation work required to connect HiPath communication systems must be carried out with full observance of IEC 60364 and IEC 60364-4-41 or the equivalent legal norms and national regulations (in the U.S. and Canada, for example).

## 1.9.2 Fire Safety Regulations

Fire safety regulations are specified in country-specific building codes. Adhere to the relevant regulations.

To conform with the legal fire protection and EMC requirements, operate the HiPath systems only when closed. You may open the system only briefly for assembly and maintenance work.

As regards their burning behavior, HiPath system cables conform to the international standard IEC 60332-1. The following standards include equivalent requirements regarding the burning behavior of cables.

| | | |
|---|---|---|
| IEC 60332-1<br><br>----------<br>Note:<br>IEC 60332-1 corresponds to UL VW-1 | EN 50265-1 with<br>EN 50265-2-1<br><br>----------<br>Note:<br>EN 50265-1 and -2-1 replace HD 405.1 | VDE 0482 parts 265-1 with<br>VDE 0842 parts 265-2-1<br><br>----------<br>Note:<br>VDE 0482 parts 265-1 and -2-1 replace<br>VDE 0472, part 804, test type B |

The responsible project management and service departments must verify whether this standard satisfies the applicable building regulations and any other additional regulations.

## 1.9.3 Screened Lines for LAN, WAN, and DMZ Connections

The following prerequisites must be met in order to comply with CE requirements relating to the electromagnetic compatibility of the communication system and its LAN, WAN, and DMZ connections:

- The communication system may only be operated with screened connection cables. This means that a screened CAT.5 cable with a length of at least 3m must be used between the screened LAN, WAN, and DMZ connection sockets of the communication system and the connection to the building utilities or the connection to active external components. The cable screen on the cable end that connects to the building utilities or active external components must be grounded (building potential equalization connection).
- In the case of shorter connections with an active external component (LAN switch or similar), a screened CAT.5 cable must also be used. However, the active component must have a corresponding screened LAN connection with a grounded screened connector (building potential equalization connection).
- The screen properties of the cabling components must comply with the requirements of the European EN 50173-1 standard on generic cabling systems and with any requirements referenced therein. The European EN 50173-1 standard is derived from the global ISO/IEC 11801 standard.
- Building utilities that have integrated and screened symmetrical copper cabling in accordance with the requirements of class D of EN 50173-1 fulfill the condition above. Class D is also attained if components (cables, connection boxes, connection cables, etc.) of category 5 (CAT.5) are installed.
- In North America, UTP cabling is normally installed (US EIA/TIA 568A standard), and the following conditions apply to the LAN connections of communication systems there: The communication system may only be operated with screened connection cables. This means that a screened CAT.5 cable with a length of at least 3m must be used between the screened LAN, WAN, and DMZ connection sockets of the communication system and the connection to the building utilities or the connection to active external components. The cable screen on the cable end that connects to the building utilities or active external components must be grounded (building potential equalization connection).
- For the LAN connection to boards in LTUs, the notes regarding the shielding connection at the opening of the LTU frame must be observed accordingly.

## 1.9.4 Labeling

This device complies with the EU guideline 1999/5/EC as confirmed by the CE certificate.

This device has been manufactured in accordance with our certified environmental management system (ISO 14001). This process ensures that energy consumption and the use of primary raw materials are kept to a minimum, thus reducing waste production.

## 1.10 Data Protection and Data Security

This telephone system uses and processes personal data, such as call detail recording, telephone displays and customer data records.

In Germany, the processing and use of such data is subject to various regulations, including those of the Federal Data Protection Law (Bundesdatenschutzgesetz, BDSG). Observe all applicable laws in other countries.

The objective of privacy legislation is to prevent infringements of an individual's right to privacy based on the use or misuse of personal data.

By protecting data against misuse during all stages of processing, privacy legislation also protects the material interests of the individual and of third parties.

**The customer is responsible for ensuring that the system is installed, operated and maintained in accordance with all applicable labor laws and regulations and all laws and regulations relating to data protection, privacy and safe labor environment.**

Employees of Siemens Enterprise Communications GmbH & Co. KG are bound to safeguard trade secrets and personal data under the terms of the company's work rules.

It is imperative to observe the following rules to ensure that the statutory provisions relating to service (on-site or remote) are strictly followed. This safeguards the interests of the customer and offers added personal protection.

**A conscientious and responsible approach helps protect data and ensure privacy:**

- Ensure that only authorized persons have access to customer data.
- Use the password features of the system with no exceptions. Never give passwords to an unauthorized person orally or in writing.
- Ensure that no unauthorized person can ever process (store, modify, transmit, disable or delete) or use customer data.
- Prevent unauthorized persons from gaining access to storage media, such as backup CDs or log printouts. This applies to service calls as well as to storage and transport.
- Ensure that storage media which are no longer required are completely destroyed. Ensure that no sensitive documents are left unprotected.

**Work closely with your customer contact; this promotes trust and reduces your workload.**

## 1.11 Documentation Feedback

If you have questions that are not answered by this document:

- Internal employees should contact their National Support Center.
- Customers should contact their retailer or the Siemens Customer Support Center.

When you call, state the title, ID number, and issue of the document.

**Example:**

- **Title:** HiPath 4000 V4, Service Documentation
- **ID number:** P31003H3140S104010020
- **Issue:** 2

# 2 Overview

This chapter provides an overview of the major system functions and components of HiPath 4000.

This manual describes the installation of the HiPath 4000. HiPath 4000 IP provides custom convergence applications and multimedia communications solutions from workstation to workstation.

The HiPath 4000 supports up to 15 directly connected access points and 83 additional access points distributed over IP.

The HiPath 4000 system is designed as a free-standing system. The number of cabinets installed in the HiPath 4000 depends on the customer configuration.

## 2.1 System Configuration

A HiPath 4000 stack consists of:

- 1 central control box CSPCI (Data and Switch Processor for Compact-PCI/ LAN). The CSPCI box can be installed as a standalone unit or separately mounted in a 19" rack.
- 3 line trunk unit cabinets (LTUs) = (3x384 ports)

Stacks 2 through 4 consists of:

- 4 LTUs each (4x384 ports each)

The AC-powered redundant HiPath 4000 has a maximum of two power box (UACD) cabinets. The DC-powered redundant HiPath 4000 has a maximum of two, 2-stack power box cabinets.

The HiPath 4000 is available in three configurations:

- AC-powered, nonredundant
- AC-powered, redundant
- DC-powered, redundant only

## 2.1.1 AC-Powered, Nonredundant HiPath 4000

The nonredundant AC-powered HiPath 4000 uses AC-to-DC shelf power supplies (LPC80s) and DC-to-DC shelf power supplies (PSUPs). You can have a maximum of 4 HiPath 4000 cabinet stacks (see Figure 1).

The CSPCI box (Data and Switch Processor for Compact-PCI/LAN) is located either in stack 1 of the nonredundant AC-powered HiPath 4000, set up individually, or mounted on a separate 19" rack. The remaining three shelves are telephony shelves called line trunk unit wide (LTUW) shelves.

The AC-powered, nonredundant HiPath 4000 allows for a maximum of up to 16,000 ports.

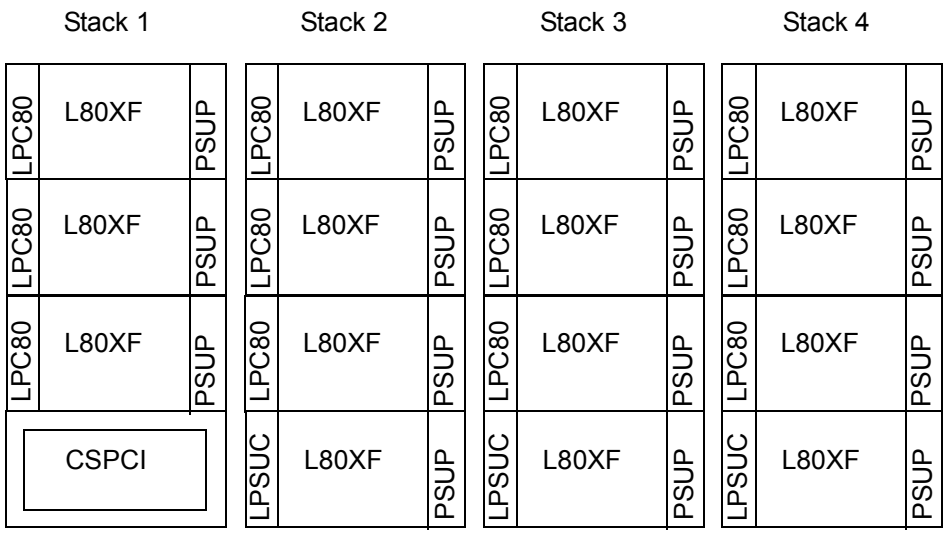



*Figure 1 HiPath 4000, nonredundant power configuration*

### 2.1.1.1 CSPCI Box

The shelf provides power supply and boards in one box.

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***IMPORTANT:*** This is a class A device. This equipment can cause interference in residential areas: In this case, the operator can be required to take appropriate measures.

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The CSPCI box provides switching unit (SWU) and administration and data processor (ADP) functions.

The SWU provides:

- A common control unit that starts and controls the call processing functions and features of the system
- A switching network that controls the voice data highways that carry information through the system
- A service unit that provides ringing, tones, conference call switching, dual-tone multi frequency (DTMF) button signals, and public network dial tones for LTU boards

The ADP:

- Places the system into service
- Provides access to system administration, maintenance, and configuration management operations (Direct AMO Dialog, UBA, HSD or RDS)
- Provides a local maintenance terminal interface
- Provides various administrative reporting and security applications

The CSPCI box is available in two configurations:

- Duplex
- Simplex Mono is not supported in the U.S.

### 2.1.1.2 Duplex

This configuration has two common controls (CC) and ADP. Each common control is powered by a separate power supply. The ADP is powered by two power supplies to ensure continuous operation during failure of one power supply.

| Slot | | Modules | |
|---|---|---|---|
| 6 | | SF2X8 | |
| 5 | | DSCXL (CC-B) | |
| 4 | | | |
| 3 | FAN | HDCF | FAN |
| 2 | • | DSCXL (CC-A) | • |
| 1 | | DSCXL (ADP) • | |
| | | PSU (1) / PSU (2) redundant | |
| | | | |

• -> Basic shelf configuration extended with:

**2 x DSCXL**: S30810-Q2311-X
**SF2X8**: S30810-Q2309-X
**RTM :** S30810-Q2312-X

### 2.1.1.3 Mono

The following table shows the CSPCI simplex configuration (mono).

| Slot | | Modules | |
|---|---|---|---|
| 6 | | | |
| 5 | | | |
| 4 | | | |
| 3 | FAN | HDCF • | FAN |
| 2 | • | | • |
| 1 | | DSCXL (ADP) • | |
| | | PSU (1) • / PSU (2) redundant | |
| | | | |

• -> Modules belong to basic shelf configuration:

**PSU**:ACPCI / DCPCI
**Fan:**C39165-A7050-B13

**DSCXL:** S30810-Q2311-X
**RTM:** S30810-Q2312-X
**MCM:** S30810-Q2313-X
**HDCF:** S30810-K2319-X300

### 2.1.1.4 LTUW Shelf

The line trunk unit wide (LTUW) shelf is the new version of the LTUE shelf. It functions as an interface between the system and the external environment using champ connectors (see Figure 2). The LTUW shelf is only available with redundant HiPath 4000 AC and DC systems.

The LTUW shelf provides slots for:

- Two DC-to-DC shelf power supplies (PSUPs)
- 16 Peripheral slots, up to 24 ports in narrowband
- A special slot for RG or peripheral signaling interface unit (SIU)
- An LTUCA board

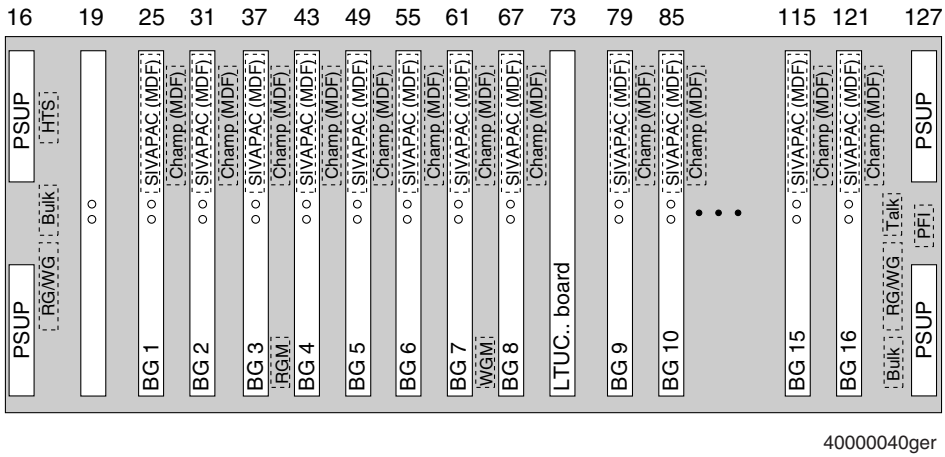


*Figure 2 LTUW backplane (connectors)*

## 2.1.2 AC-Powered, Redundant HiPath 4000

The AC-powered, redundant HiPath 4000 configuration consists of up to four HiPath 4000 cabinet stacks and a power supply stack with up to two UACDs (unit alternating current distribution); see Figure 3. A 2-cabinet HiPath 4000 cabinet stack receives input power from one UACD. A third and fourth cabinet stack requires a second UACD, which receives input power from a wall outlet (U.S.) or a junction box (I.M.).

A fully configured AC-powered, redundant HiPath 4000 can provide up to 16,000 ports, depending on the trunk and subscriber configuration.

The HiPath 4000 system uses SIPAC LTUW shelves. SIPAC and SIVAPAC shelves cannot be mixed in the same system.

The AC-powered, redundant HiPath 4000 allows for a maximum of up to 16,000 ports.

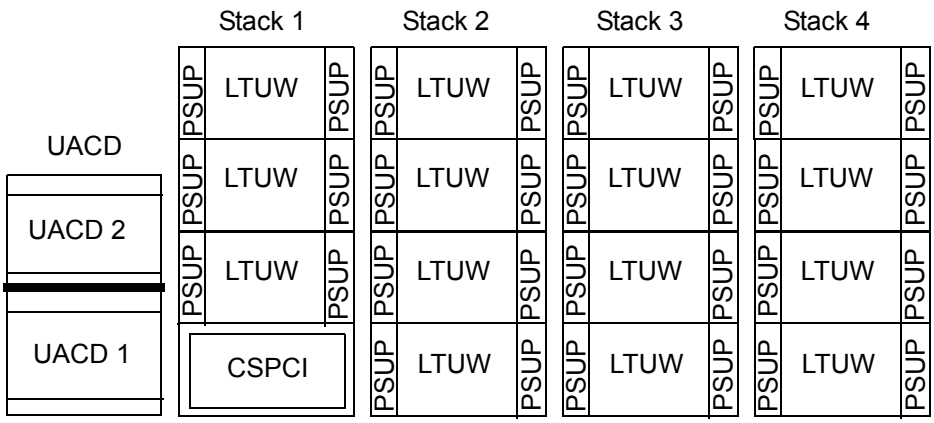


*Figure 3 HiPath 4000, AC-powered, redundant CPU configuration*

Physical shelf numbering is consecutive from bottom-to-top in each cabinet. LTUW shelves are also numbered by logical position. The LTUW logical shelf numbering is consecutive from bottom-to-top and left-to-right in each system.

The cabinet stack layout is as follows:

- Base cabinet: ADP and SWU in a CSPCI box
- All other shelves: LTUW shelves

## 2.1.3 DC-Powered, Redundant HiPath 4000

The DC-powered HiPath 4000 is available in a redundant configuration only. It consists of up to four HiPath 4000 cabinet stacks and up to two power supply stacks with as many as four UDCDs (unit direct current distribution) each; see Figure 4. Each DC-powered HiPath 4000 cabinet stack receives input power from one UDCD. The UDCD receives input power from a DC power system.

A fully configured, DC-powered HiPath 4000 can provide up to 16,000 ports, depending on the trunk and subscriber configuration.

The HiPath 4000 system uses SIPAC LTUW shelves. SIPAC and SIVAPAC shelves cannot be mixed in the same system.

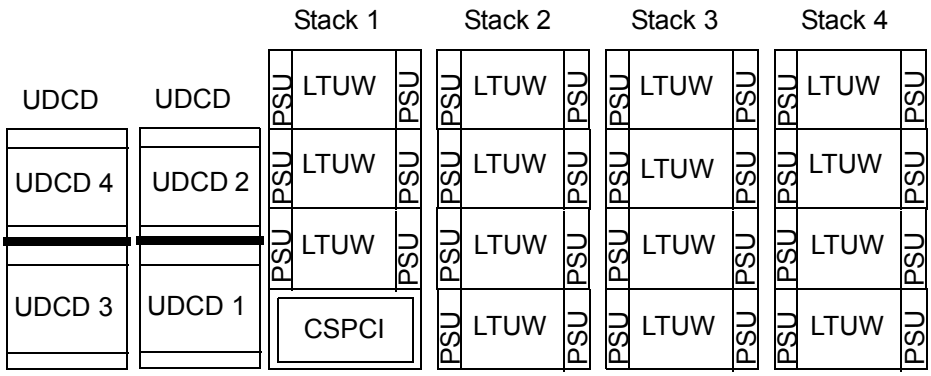


*Figure 4 HiPath 4000, DC-powered, cabinet layout*

Physical shelf numbering is consecutive from bottom-to-top in each cabinet. LTUW shelves are also numbered by logical position. The LTUW logical shelf numbering is consecutive from bottom-to-top and left-to-right in each system.

The cabinet stack layout is as follows:

- Base cabinet: ADP and SWU in a CSPCI box
- All other shelves: LTUW shelves

## 2.1.4 AP 3700 Cabinets

With HiPath 4000 V2.0, new 19" shelves (AP 3700-9/AP 3700-13) are used for system expansion. These 19" shelves can be used in a 19" cabinet or a standalone configuration (see Figure 5).

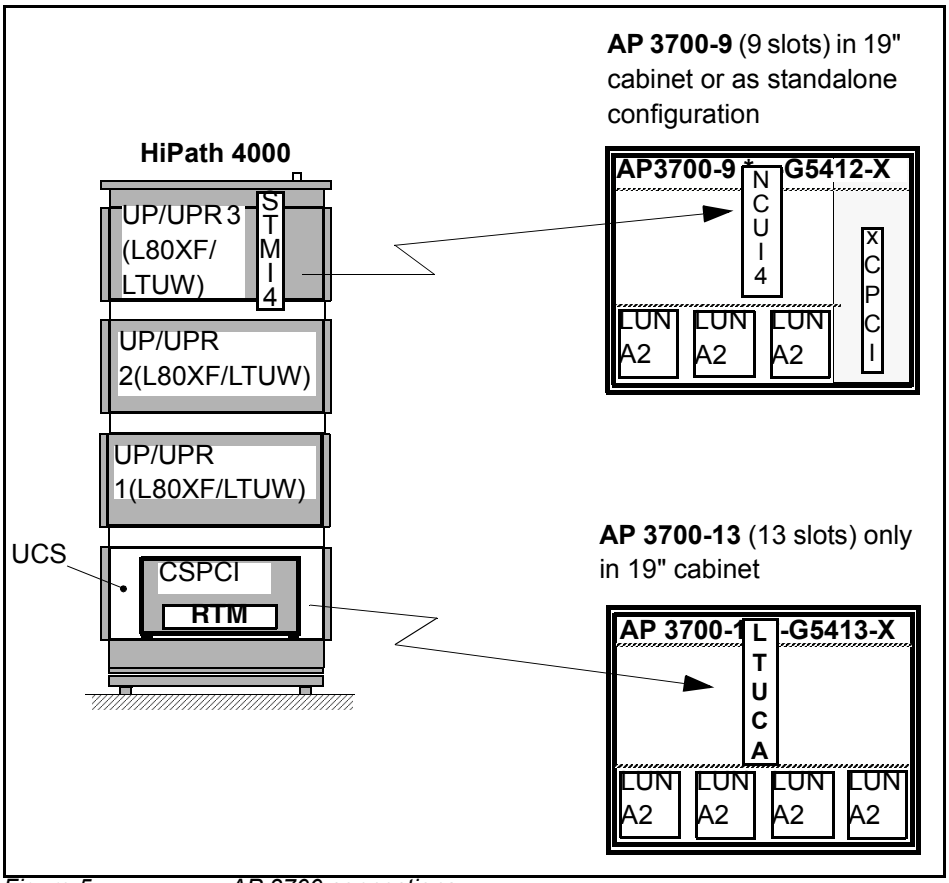


*Figure 5 AP 3700 connections*

## 2.1.5 Survivability Server

The Survivability Server takes over operation of the access points if central control fails. It can only be used in AP 3700 IP access points.

However, Survivability Server can control all types of IPDA access points (AP 3300 IP, AP 3500 IP, AP 3700 IP) in emergency situations, regardless of whether the access points are equipped with NCUI(1) or NCUI2.

Survivability Server consists of a cassette with a cPCI backplane, DSCXL processor, HDMO/HDCF module, power supply unit and redundant fan trays.

Depending on the power supply module used, it can be operated with an 110/ 230Vac or 48 Vdc supply.
In AP 3700 IP, there is no electrical connection between the access point and the server.

The Survivability Server and NCUI of the same access point communicate with each other exclusively via the IP network (see also the service manual for "HiPath 4000 V4.0 IP Solutions, IPDA&APE").

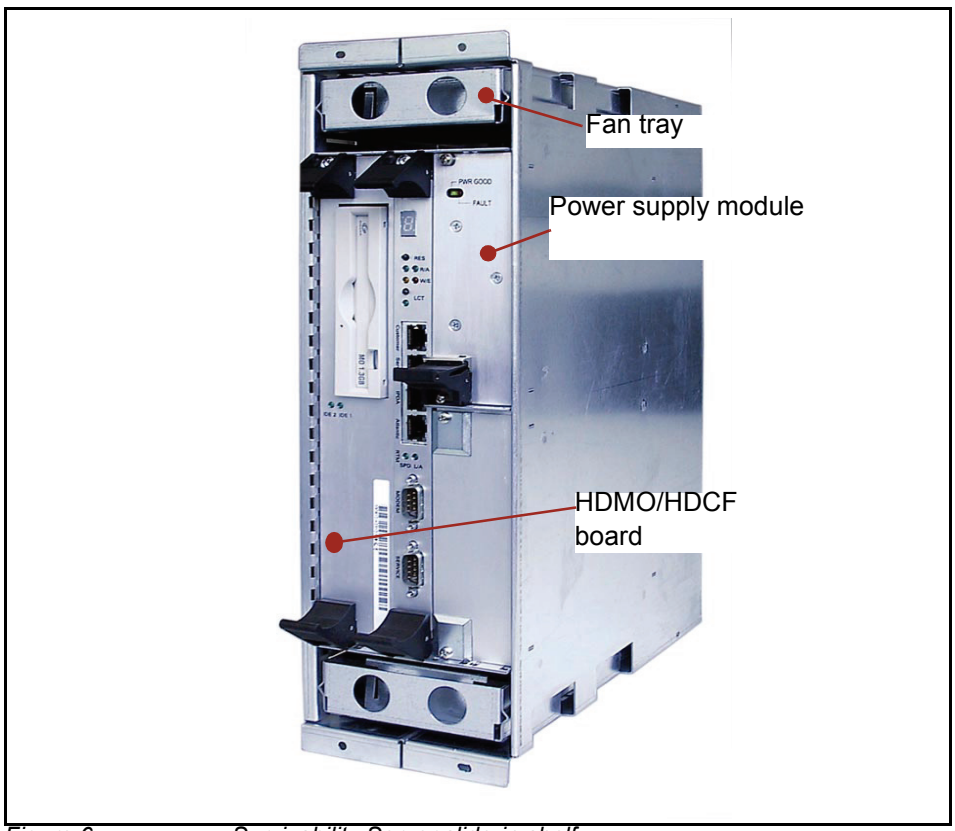


*Figure 6 Survivability Server slide-in shelf*

## 2.2 Switching Units

The switching unit (SWU) consists of a common control unit function, a switching network function, and a service unit function.

The HiPath 4000's SWU functionality is implemented in the DSCXL board. The DSCXL board acts as common control unit and provides switching network and service unit functions, and Siemens LAN connectivity, through the SL200 board.

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***NOTE:*** This 2-board set also provides the ADP functions.

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### 2.2.1 Common Control Units

The common control unit performs and controls the call processing functions and features of the system. These functions are distributed among the various hardware subcomponents in the common control cabinet.

The HiPath 4000 SWU common control subcomponents are:

- DSCXL board (data processor controller 586) with LAN and 256 MB of dynamic memory
- RTM board as interface between LTU and processor shelves
- Clock generator function included on the RTM board (memory time switch with clock generator MTSCG)
- SF2x8 board for LAN connections

### 2.2.2 Switching Networks

The switching network is a time-division switching matrix that controls the voice data highways that carry the flow of information through the system. Voice data highways provide the communication channels between the switching network, the telephony shelves, and the service unit.

The memory time switch section of the RTM board performs the switching network function in a HiPath 4000 system. In large systems the signaling interface and conference expanded (SICOE) board provides additional memory time switching functionality.

The SWU DSXCL board and common control boards control the RTM board over the multibus.

## 2.2.3 Service Units

The service unit function provides ringing, tones, conference call switching, dual-tone multifrequency (DTMF) button signals, and public network dial tones for telephony boards.

The service unit functions in a HiPath 4000 are distributed among the following:

- SICOE board
- Signaling interface unit peripheral extended (SIUX2) board
- Ring generator

## 2.3 Telephony Shelves

Telephony shelves provide the interface between the system and the external environment including the following:

- Telephone and maintenance terminal stations
- Trunks and network services (public and private)
- Devices connected to internal servers

---

***NOTE:*** Certain devices and applications can be, or must be, directly interfaced to the internal or external server. This is accomplished using the DSCXL, HUBC, LAN connection, SL200, or PSIO board. Refer to the HiPath 4000 Service Manual for additional information about these boards.

---

**Type of telephony cabinet:**

- Internal telephony cabinet—L80XF or LTUW cabinet

  The functional components of the L80XF or LTUW cabinets consists of:

  – LTUCA board (Line Trunk Unit Controller Advanced)

  – Subscriber-line module boards

  – Trunk module boards

  – LTU signal cables

## 2.4 External Servers

The HiPath 4000 applications operate in dedicated internal or external servers, allowing the SWU to be dedicated to call processing services. Internal servers always reside in the CSPCI boxes. External servers reside outside the cabinets. Refer to Table 1 for an overview of the server types and the applicable applications.

| | **Server Types** | |
|---|---|---|
| **Applications** | **Administrative Data Processor (ADP)** | **External Server** |
| Administrative data processor | X | |
| PhoneMail | | X |
| Xpressions | | X |
| CallBridge | | X |

*Table 1 Server types and applications overview*

| | Server Types | |
|---|---|---|
| HiPath 4000 Manager | | X |
| HiPath ProCenter Standard and Advanced | | X |
| Hicom Trading System | | X |

*Table 1 Server types and applications overview*

## 2.4.1 Administrative Data Processor (ADP)

The ADP is the primary internal server and is a mandatory component of all systems. Its main function is administration and maintenance of the system.

The standard functions of the ADP are:

- System startup
- Direct AMO dialog (DAD) access for configuration administration
- Remote maintenance administration (RMA)
- Local maintenance terminal interface
- Call Detail Recording
- Traffic metering and statistics

### 2.4.1.1 System Startup

The ADP is responsible for commissioning (placing into service) the system.

The commissioning sequence occurs after powering on a system and after a software- or hardware-initiated system restart (reload or hard restart only).

The ADP also reloads flashware and loadware on a subsystem level (ADP, SWU, and ACD secondary server) and an individual module level (after deactivation and activation of boards).

The commissioning sequence is as follows:

- Startup of ADP:
  - Loading ADP common control unit flashware
  - Loading ADP common control unit software
  - Starting basic operation of ADP common control unit
  - Initializing the ADP interface ports
  - Loading the ADP interface ports
  - Starting the ADP interface ports
- Startup of switching unit:
  - Loading SWU flashware
  - Loading SWU software
  - Starting basic operation of the SWU
  - Copying Unixware command file for database
  - Generating the database
  - Loading the loadware on telephony boards
  - Starting telephony boards
  - Starting the call processing operation

### 2.4.1.2 Direct AMO Dialog (DAD) Access

The HiPath 4000 Manager provides direct command line access for administration and troubleshooting configuration and system problems.

### 2.4.1.3 Remote Maintenance and Administration

The Unixware-based RMA application provides major and minor alarm reporting.

RMA requires a CCA II (asynchronous) modem to support the following:

### 2.4.1.4 Local Maintenance Terminal Interface

This interface provides for the physical connection of a maintenance terminal to the ADP and access to Unixware applications.

### 2.4.1.5 Call Detail Recording

CDR provides traffic statistics for monitoring system activity and evaluating system performance. CDR statistics can also be used by the traffic metering and statistics application.

### 2.4.1.6 Traffic Metering and Statistics Application

This program is a Unixware-based application that analyzes system performance and generates tabular data for evaluating and optimizing system resources.

### 2.4.1.7 System Security

Application software in the ADP provides for system security. The system administrator uses the software to assign user passwords and control the access level of those passwords. This prevents unauthorized access to the system and to critical system files, databases, and administration or maintenance facilities.

### 2.4.1.8 RDS

Realtime Diagnostics System (RDS), formerly trunk diagnostics system (TDS), is a diagnostic tool that provides telephony fault localization for station and data lines and limited trunk fault reporting capabilities for trunk facility problems. It provides tools and features that allow you to solve line and trunk problems more efficiently

### 2.4.1.9 HSD

The hardware and symptom diagnosis (HSD) tool is a browser-based application that resides on the Primergy server. HSD functionality consists of menu choices within the HiPath 4000 Manager client application. HSD can be used either remotely or locally. It is designed to improve usability, reduce service time, reduce cost, and enhance serviceability.

## 2.5 Internal Servers

Internal servers are optionally available in all HiPath 4000 systems. The internal servers are configured in the DSCXL board.

### 2.5.1 Internal Server Common Control Unit

The internal server common control unit administers and controls the functions and features of the application software running on the internal server. It consists of the following subcomponents:

- DSCXL board
- SF2x8 board

Each of the common control unit boards interface with one another over the multibus/PCI bus.

# 3 Preparing for Installation

This chapter contains important information and describes the steps involved in installing cabinets with main distribution frames.

## 3.1 Installation Procedures Matrix

| Installation Steps | Refer to: | OK? |
|---|---|---|
| 1. Prepare for installation | | |
| a) Installation materials. | Section 3.2, “Installation Materials” | |
| b) Verify the site. | Section 3.3, “Conducting the Site Verification” | |
| c) Receive the system. | Section 3.4, “Receiving the System” | |
| d) Inspect for shipping damages. | Section 3.5, “Inspecting for Shipping Damage” | |
| e) Remove the system from its packaging. | Section 3.6, “Removing the System from its Packaging” | |
| f) Remove the system from the pallet. | Section 3.7, “Unloading a System with a Roller Base from the Pallet” | |
| g) Position the cabinets. | Section 3.8, “Positioning the Cabinets” | |
| h) Level the cabinets. | Section 3.9, “Leveling the Cabinets” | |
| i) Remove the front covers. | Section 3.10, “Removing the Front Covers” | |
| j) Remove the back covers. | Section 3.10.3, “AP 3300 Back Covers” | |
| k) Check and read the labels in the cabinets. | Section 3.11, “Important Labels on the System” | |
| l) Inventory the system hardware. | Section 3.12, “Inventorying the System Hardware” | |
| m) Inventory the system software. | Section 3.13, “Inventorying the System Software” | |
| n) Inventory the installation kit. | Section 3.14, “Inventorying the Installation Kit” | |
| o) Perform pre-installation trunk procedures. | Section 3.15, “Pre-Installation Trunk Procedures” | |
| p) Install seismic anchors, if applicable. | Section 3.16, “Installing Seismic Anchors” | |

*Table 1 Installation matrix*

| Installation Steps | Refer to: | OK? |
|---|---|---|
| q) Install the cable channels. | Section 3.18, “Installing the Cable Channels” | |
| 2. Ground the HiPath 4000. | | |
| a) Ground the MDF, I.M. | Section 6.1, “Grounding the MDF, I.M.” | |
| b) Connect and ground the cabinets. | Section 6.2, “Connecting and Grounding the Cabinets” | |
| c) Ground the system. | Section 6.3, “Grounding the System, I.M.”<br>Section 6.4, “Grounding the System, U.S.” | |
| 3. Connect the power supply. | | |
| a) Connect to the mains. | Section 7.1, “Connecting to the Mains” | |
| b) Install a three-phase connection. | Section 7.2, “Installing a Three-Phase Network” | |
| c) Install a single-phase connection. | Section 7.3, “Installing a Single-Phase Network” | |
| d) Install a three-phase or single-phase connection with mid-point grounding. | Section 7.5, “Installing a Three-Phase or Single-Phase Connection with Mid-Point Grounding, I.M.” | |
| e) Connecting the Battery to the Power Box, I.M. | Section 7.13.1, “Connecting the Battery to the Power Box, I.M.” | |
| f) Connect the MDF (I.M.). | Section 7.19.1, “Connecting the MDF for a Redundant System, I.M.” | |
| g) Connect the power box to the system. | Section 7.19, “Connecting the Power Box to the System” | |
| 4. Install the signal cables. | Section 8.1, “Installing Signal Cables” | |
| 5. Install the service alarm cable and trunk bypass. | Section 8.2, “Installing the Service Alarm Cable and Trunk Bypass” | |
| 6. Install the external cables. | Section , “External Cabling Assemblies” | |
| 7. Install the peripheral equipment, if applicable. | Section , “Installing Peripheral Equipment” | |
| 8. Install the IPDA, if applicable. | Section , “Installing the IPDA” | |
| 9. Start the system. | | |
| a) Perform pre-power-on checks. | Section 12.2, “Pre-Power On Checks” | |
| b) Apply power to the HiPath 4000. | Sections 12.3 to 12.9 | |

*Table 1 Installation matrix*

| Installation Steps | Refer to: | OK? |
|---|---|---|
| c) Enable the clock batteries. | Section 12.10, “Activating the Clock Battery on the DSCXL Board” | |
| d) Set the date and time. | Section 12.11, “Setting the Date and Time” | |
| e) Install the database. | Section 12.12, “Installing the Customer Database” | |
| f) Start the HiPath 4000. | Section 12.13, “Starting the System” | |
| g) Connect to the maintenance terminal. | Section 12.14, “Connecting to the TAP, I.M.” | |
| h) Replace the covers. | Section 12.15, “Replacing the Covers” | |
| 10. Verify the System. | | |
| a) Check the boards. | Section 13.2, “Checking the Boards” | |
| b) Check the cables. | Section 13.3, “Checking the Cables” | |
| c) Check and test the features. | Section 13.4, “Checking and Testing the Features” | |
| d) Test the restart and failure transfer function. | Section 13.5, “Testing the Restart and Failure Transfer Function” | |
| e) Backup the customer data. | Section 13.6, “Backing up the Customer Data” | |
| f) Set and activate the HTS function. | Section 13.7, “Setting and Activating the HTS Function” | |
| g) Verify the ring generator. | Section 13.8, “Checking the Ring Generator” | |
| h) Verify the station-to-MDF connections. | Section 13.9, “Verifying the Station-to-MDF Connections” | |
| i) Verify transmission facilities. | Section 13.10, “Verifying Trans-mission Facilities” | |
| j) Verify the MO disk. | Section 13.11, “Verifying the MO-Disk Drive” | |
| k) Verify the hard disk. | Section 13.12, “Verifying the Hard Disk” | |
| l) Verify the operation of system features and servers. | Section 13.13, “Verifying the Operation of System Features and Servers” | |
| m) Verify the system bypass | Section 13.14, “Verifying the System Bypass” | |

*Table 1 Installation matrix*

## 3.2 Installation Materials

The installation materials used to build your system are provided in the system assignment list. This list is produced on a customer-specific basis and is supplied with the system. Table 2 lists the standard tools that are used in installing the HiPath 4000.

***NOTE:*** Check your tools regularly. Only use intact tools.

| Tools | Size |
|---|---|
| Allen key wrenches | Complete set |
| Cable stripper | |
| Channel lock pliers, large | |
| Communication technician's pliers | |
| Compass saw | |
| Cross-head screwdriver (Phillips screwdriver in the U.S.) | |
| Diagonal cutting pliers | |
| Drill | |
| Gloves | |
| Hammer | 400 g |
| Insertion tool (board removal and replacement tool in the U.S.) | |
| Level | |
| Meter stick (yardstick in the U.S.) | |
| Module key (board removal and replacement tool in the U.S.) | |
| Ring or flat spanners (open-ended socket wrench in the U.S.) | 8 mm to 19 mm (.3 to .7 in) |
| Socket spanner set (socket wrench in the U.S.) | 10 mm to 19 mm (.4 in to .7 in) |
| Screwdrivers | 2 mm to 8 mm<br>In the U.S.: Phillips (no. 2 and no. 3) and flat-blade (3/16 inch by 4 inch) |
| Seismic anchor kit (if applicable) | |
| Side cutter | |
| Soldering iron | |
| Spirit level (level in the U.S.) | |
| Stripping knife | |
| Telephone pliers (long-nose pliers) | |

*Table 2 Standard installation tools*

| Tools | Size |
|---|---|
| Terminal crimping pliers (crimpers in the U.S.) | Up to 50 mm (2 in) |
| Torx screwdrivers | Complete set |
| Wrench, hex key, 6 mm | |
| Wrench, hex socket, 7/32 inch | |
| Wrist band and conductive pad (ESD equipment in the U.S.) | |

*Table 2 Standard installation tools*

The following tools are required for pre-installation tasks:

- Scissors
- Screwdriver, flat-blade 3/16 inch by 4 inches
- Screwdriver, Phillips no. 3
- Wrench, 8-inch adjustable
- Wrench, 10-mm hex socket
- Wrench, 9/16-inch hex socket

## 3.3 Conducting the Site Verification

Arrange for a qualified electrical contractor to conduct a walk-through with you and check the site for customer compliance to site engineering conditions, including power and grounding, cabinet and peripheral space allocations and safety requirements. In the U.S., customer site requirements are specified in the following documents:

- Site map
- Customer Site Planning Guide
- Power and Grounding Guide and Specifications.

## 3.4 Receiving the System

On delivery to customer facilities, the following components are already installed: modules, power supplies, MO disk drive and hard disks. The packing list, bill of materials, and hardware map are also shipped with the system.

## 3.5 Inspecting for Shipping Damage

Before accepting the delivery of any equipment:

1. List any obvious external damage on the shipping documents, then ask the delivery personnel to sign the documents.
2. Handle any damage according to local procedures.

## 3.6 Removing the System from its Packaging

**CAUTION**

**Risk of injury when unpacking the system**
Never try to lift heavy objects without assistance.

To remove the system from its packaging:

1. Cut and dispose the pallet strapping.
2. Remove and dispose of packing materials.
3. Examine the system for damages during transportation.
4. Record and report any damages according to local procedures or the appropriate service center.

**WARNING**

**Electric shock caused by damaged material**
Replace the power cable immediately if it shows any signs of damage. Replace any damaged safety equipment (covers, labels and ground wires) immediately.

## 3.7 Unloading a System with a Roller Base from the Pallet

***IMPORTANT:*** Place the pallet as close to the equipment room as possible before removing the cabinet.

To remove a system with a roller base from the pallet (see Figure 1):

1. At the base of the cabinet, remove the screws on the left and right sides of the pallet.
2. Tilt the system slightly to one side (1) and slide out the crosspiece (2). Repeat this procedure on the other side.
3. Push the two boards to the middle (3) and slide them out (4).
4. Place the system at the designated installation location.
5. Secure the casters (5) by pressing the caster locks downwards.

---

***NOTE:*** Secure all four casters (only for a 3 or 4-cabinet system) to prevent the system from rolling away. Lock the rollers once the system is installed or moved.

---

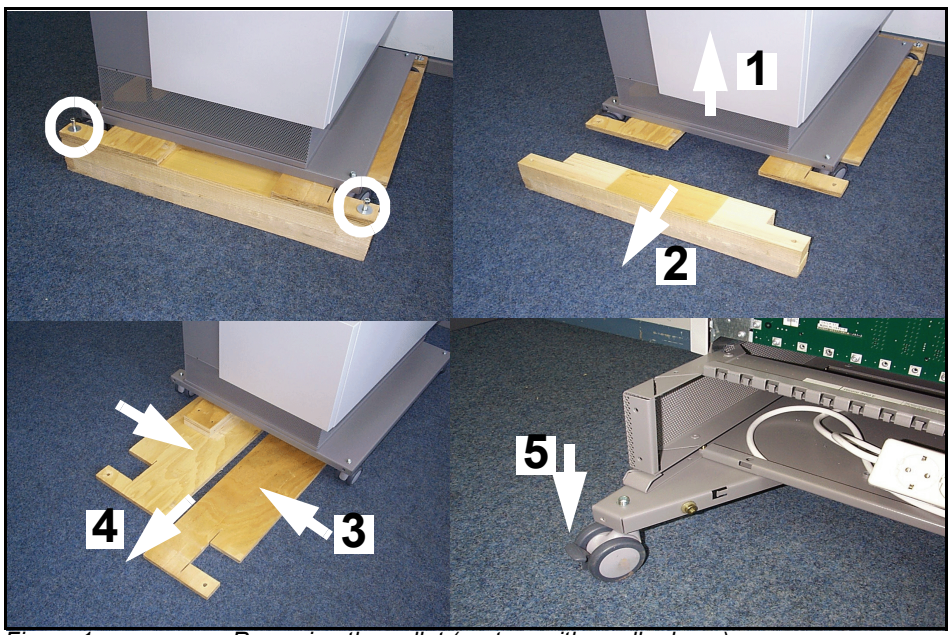


*Figure 1 Removing the pallet (system with a roller base)*

## 3.8 Positioning the Cabinets

In multicabinet systems, position cabinet 1 in the equipment room first, then position the additional cabinets.

To position the cabinet in the equipment room:

1. Unlock the casters by lifting the caster locks upwards on the cabinet leveling assembly (see Figure 2).
2. Roll the cabinet into the location specified by the equipment room floor plan.

3. Lock the casters by pushing the lock on the cabinet leveling assembly downwards.

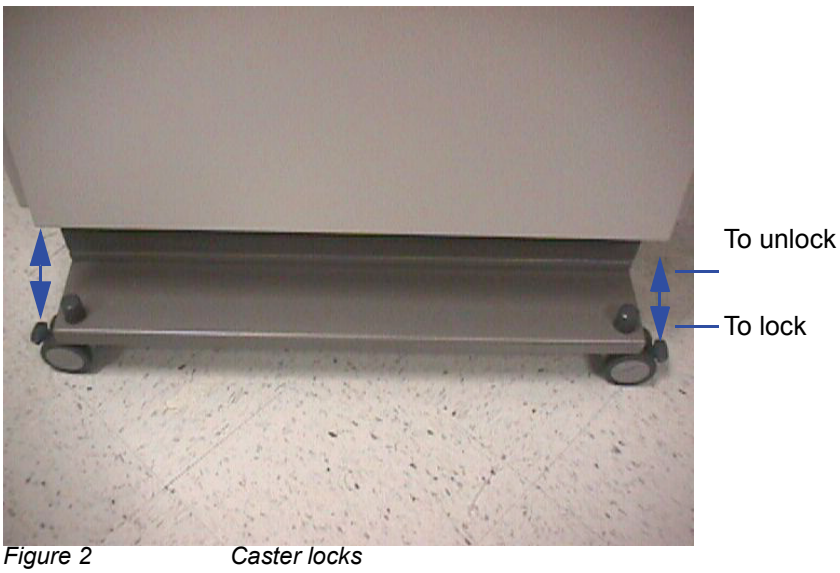


*Figure 2 Caster locks*

## 3.9 Leveling the Cabinets

This chapter describes how to level a system with a roller base or with a standalone cabinet.

### 3.9.1 Leveling a Roller Base

To level the cabinets (see Figure 3):

1. Use a wrench to loosen the lock nut on the caster (1).
2. Use the Allen wrench to adjust the height of the caster (2).
3. Once the height is adjusted, tighten the lock nuts.


*Figure 3 Leveling the casters*

## 3.9.2 Leveling an AP 3700-9 (Standalone)

***IMPORTANT:*** This procedure applies only for the AP3700-9. The AP3700-13 cabinet should only be installed in a 19" shelf and is not intended for standalone installation.

To level the cabinet (see Figure 4):

1. Use a wrench to loosen the lock nut (1) on the caster.
2. Adjust the height of the foot by turning the wrench (2) left or right.
3. Once the height is adjusted, tighten the lock nut (1).

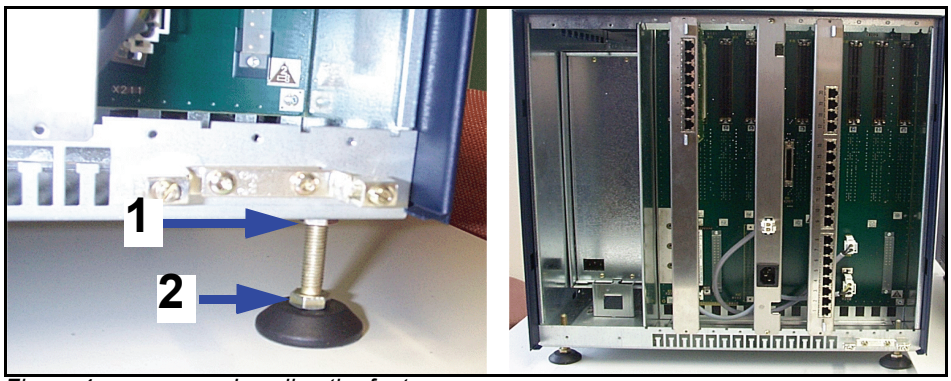


*Figure 4 Leveling the feet*

# 3.10 Removing the Front Covers

This chapter describes how to remove the covers on the relevant system cabinets.

## 3.10.1 AP 3300 Front Covers

To remove the front covers in a HiPath 4000:

1. Find the two slots under the front cover (see arrows under the front cover on Figure 5).).
2. Insert a 5/8-in. (or smaller) flat-blade screwdriver into each of the two slots and push hard (until you hear a click) to release the cover.


*Figure 5 Removing the front covers (1)*

3. Pull the bottom part of the front cover away from the cabinet and lift upwards (see Figure 6).
4. Place the cover in a safe location.

*Figure 6 Removing the front covers (2)*

## 3.10.2 AP 3700 Front Covers

The covers are only used with the standalone version (AP3700-9). These covers are only snapped into guide slots in the housing. They can easily be removed by pulling them toward the front (see Figure 7).

The back covers can be removed in the same way, by pulling them toward the back.

*Figure 7 Removing the AP 3700-9 cover*

## 3.10.3 AP 3300 Back Covers

To remove the back covers:

1. At the top of the cabinet, remove the screw on the top cover with a flat-blade screwdriver (see Figure 8 and Figure 9).
2. Using two hands, lift the cover upwards to disengage it from the cabinet frame mounting bracket.

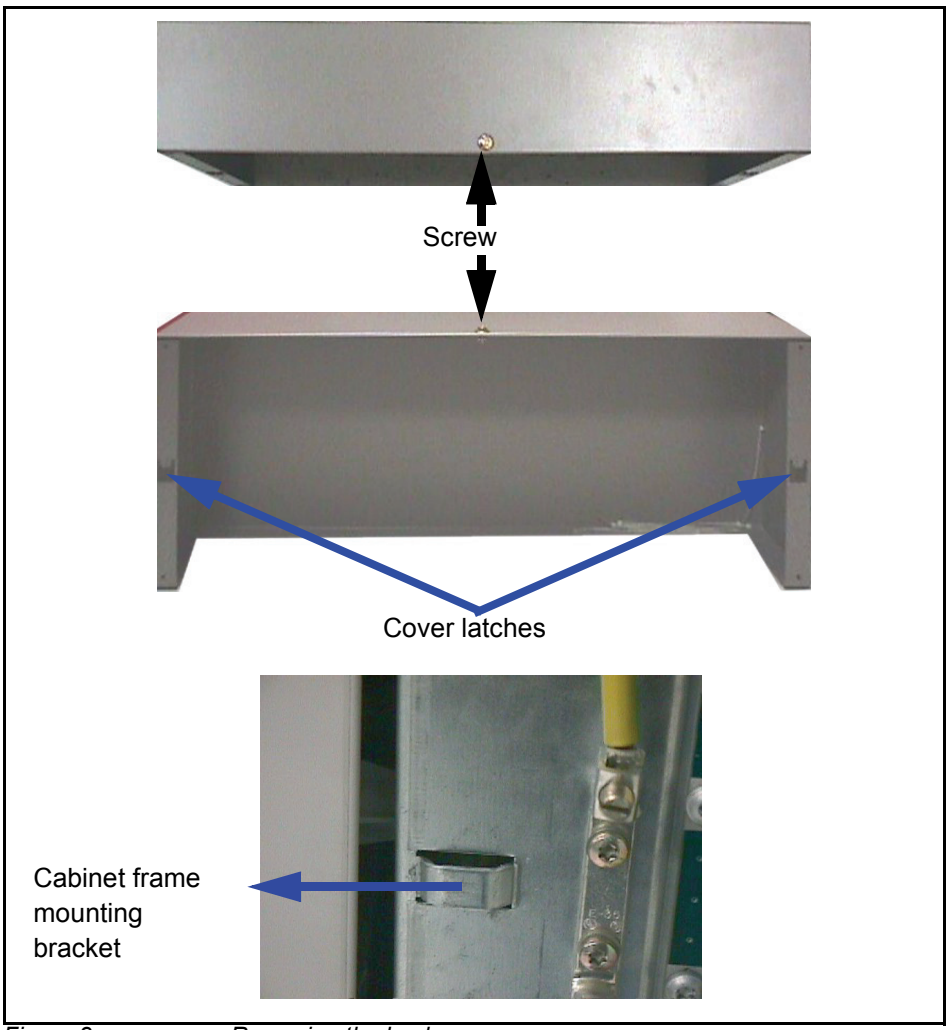


*Figure 8 Removing the back cover*

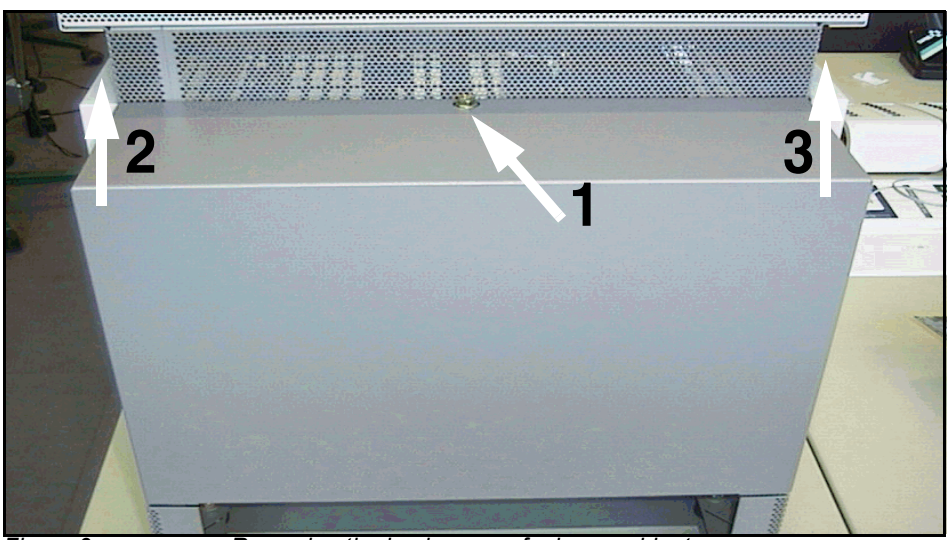


*Figure 9 Removing the back cover of a base cabinet*

3. If the system contains multiple cabinets, remove the remaining covers from the lower cabinets by following step 2 (see Figure 10).
4. Place the cover in a safe location.

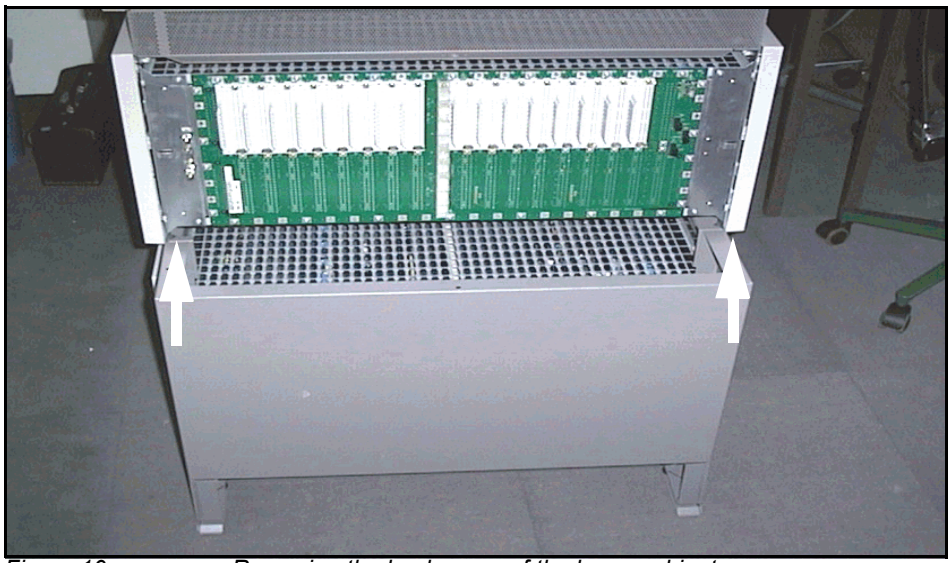

*Figure 10 Removing the back cover of the lower cabinet*

## 3.11 Important Labels on the System

Upon removing the covers, pay attention to the labels that are on the system (see Figure 11, Figure 12, and Figure 13).

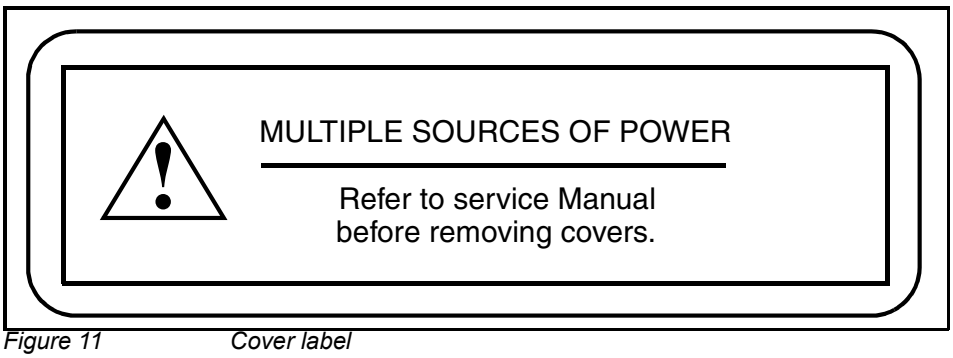


*Figure 11 Cover label*

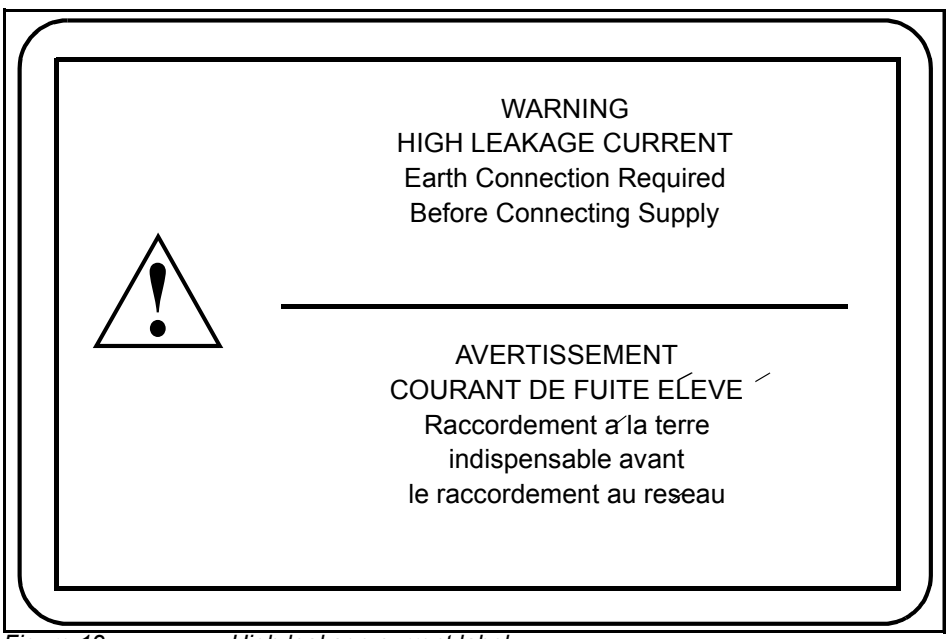


*Figure 12 High leakage current label*

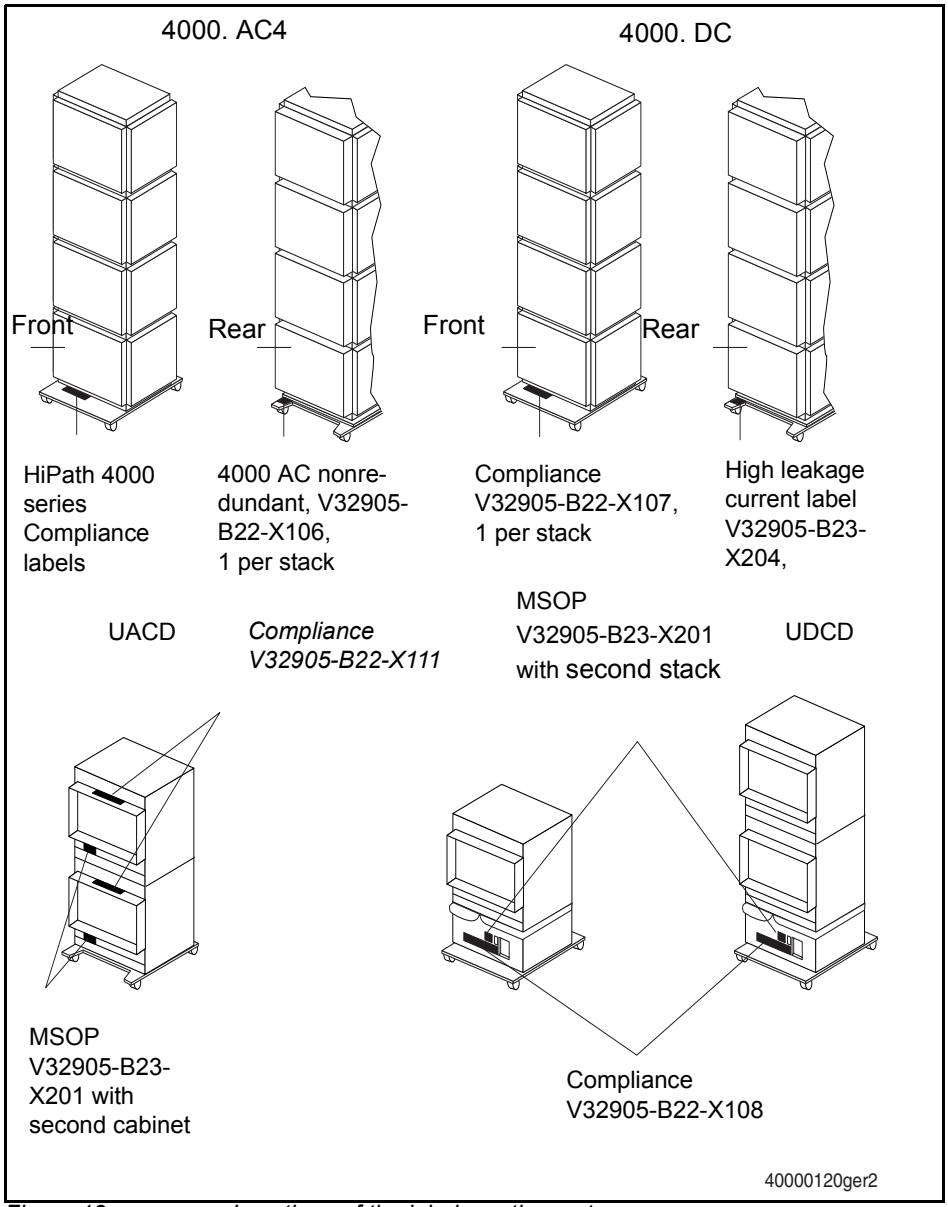


*Figure 13 Locations of the labels on the system*

## 3.12 Inventorying the System Hardware

To verify each cabinet hardware

1. Compare the hardware in the cabinet against the packing slip, bill of materials, and hardware map.
2. Handle any discrepancies according to local procedures and record them on the Installation Report form.

## 3.13 Inventorying the System Software

The system hard disk contains the latest correction version (KV) load or system call processing software along with the RMX and Unixware operating system.

A backup software (customer database) is supplied in the MO drive.

## 3.14 Inventorying the Installation Kit

***IMPORTANT:*** An installation kit is shipped with each system.

To inventory the installation kit, refer to the packing list that accompanies the system.

## 3.15 Pre-Installation Trunk Procedures

To prepare for trunk installation:

1. Obtain the following trunk information from the facility provider:
   - Trunk installation schedule of the Facility provider
   - Grade of service to be delivered
   - Trunk circuit identification—this identifies the trunk circuit to the telephone company
   - RJ21X pin assignments

- Maintenance limits

***IMPORTANT:*** The facility provider has maintenance limits that determine how much the circuit loss can vary before the facility provider responds to correct it.

2. Confirm with the facility provider coordinator that all trunk testing has been scheduled with the telephone company or vendor.

## 3.16 Installing Seismic Anchors

Depending on the regulations in your state or country, you may be required to install seismic anchors. Consult your facility's technical personnel if your installation requires seismic anchors; refer to the procedure described below.

The following information about installation of seismic anchors is based on the 2001 California Building Code.

To install the seismic anchors:

1. Ensure that the earthquake kits are supported on a floor located at or below grade level of the building.
2. Ensure that a qualified engineer reviews the anchorage and adequacy of the floor for the following conditions:
   - The concrete is normal weight stone aggregate concrete with a compressive strength of a least 2,000 psi.
   - If on-site concrete specifications are not available, strength is determined by testing cores, if required by OSHPD.
   - The floor slab is at least 4 inches thick and capable of supporting loads imposed by the equipment.
   - Drilled-in anchors must be used on prestressed concrete floors (pre- or post-tensioned) unless tension wires are positively located (refer to step 5).
3. Install the anchors in accordance with applicable provisions of the International Conference of Building Officials (ICBO) Evaluation Report and manufacturer's recommendations (refer to Fischerwerke Artur Fischer GMBH & Co. KG, D-72178 Tumlingen, Waldachtal, Germany).
4. Perform a load test of 50% of the anchors in accordance with the California Department of General Services, division of State Architect, Interpretation of Regulations Document 19-1, September 1, 1999 (reference, Expansion Bolts

or Epoxy Type Anchors in Concrete).

There are two methods for load testing the anchors:

– Hydraulic Ram Method—the test load for the 12 mm anchors in tension is 3200 lbs.

– Torque Wrench Method—the installation torque is 35 ft-lbs according to manufacturer's specifications. The test torque must be reached within one-half turn of the nut. Torque testing can occur on an individual basis if test procedures have been submitted to and approved by OSHPD.

5. When installing drilled-in anchors into existing pre-stressed concrete (pre- or post-tensioned), locate the prestressed tendons by using non-destructive methods before installation.

---

***NOTE:*** Use extreme care and caution when you install drilled-in anchors in existing non-prestressed reinforced concrete to avoid cutting or damaging the existing reinforcing bars and tension wires during installation.

---

6. Maintain a minimum clearance of one inch between the reinforcement and the drilled-in anchor.
7. The M8 high-strength bolts that connect the bracket to the cabinet frame are Grade 5. Tighten the bolts to 35-40 ft-lbs. to ensure that they do not slip in the slotted holes.

## 3.17 Stacking HiPath 4000 Cabinets

The factory ships the HiPath 4000 cabinets already stacked according to configuration of the system that has been ordered (see Figure 14 for an example).

To add cabinets to the system, refer to Section , "Adding Cabinets to the System".

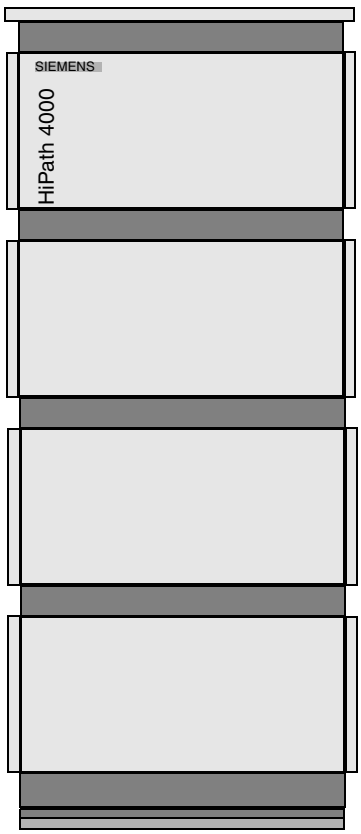


*Figure 14 HiPath 4000 stacked cabinets (front view)*

## 3.18 Installing the Cable Channels

To install the cable channels:

1. At the back of the base cabinet, place the cable channel against the cabinet as shown in Figure 15.
2. Secure the cable channels with screws.

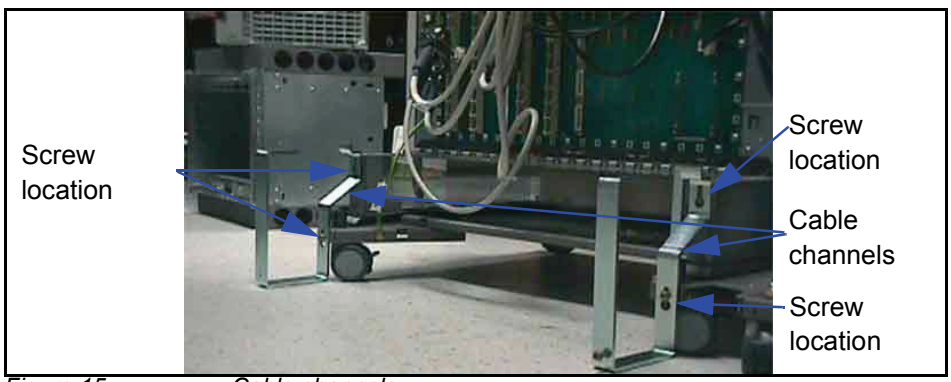


*Figure 15 Cable channels*

# 4 Special Installation Notes

This chapter provides special instructions about installing the HiPath 4000.

## 4.1 Removing 24-Port Boards

Always follow the electrostatic discharge (ESD) prevention procedure when you remove and replace boards. Failure to follow ESD prevention procedures can result in permanent or intermittent board failures. Refer to the HiPath 4000 Service Manual for step-by-step ESD prevention procedures.

***NOTE:*** Follow the **electrostatic discharge prevention** procedures.

- Always put on the ESD wrist strap on your bare wrist before you touch any of the boards or assemblies.

Only transport the boards in ESD protective packaging.

Always place and work with the boards on a grounded conductive pad.

**WARNING**

**Risk of electric shock while working on the power system**
To avoid electrical shock, never wear the ESD wrist strap while working on the power system or at the back of the cabinet. Danger of electric shock!

To remove or install boards:

1. Only use the supplied board removal and replacement tool (see Figure 1).
2. Refer to the markings on the board removal and replacement tool for instructions on how to use it.

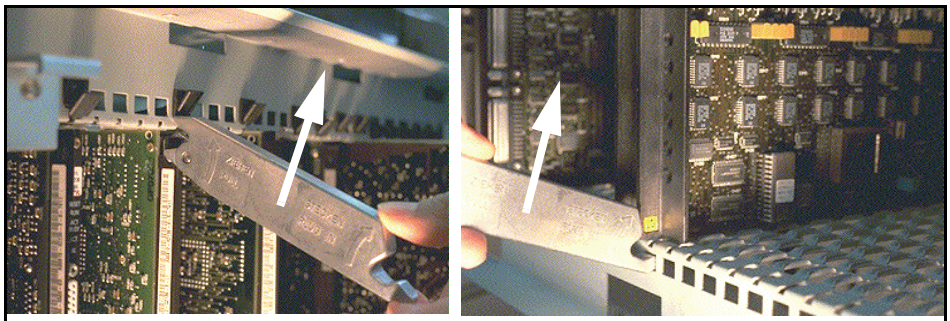


*Figure 1 Removing and installing the board*

## 4.1.1 SIVAPAC-to-SIPAC Adapter

A SIVAPAC-to-SIPAC board adapter (Adapter 1) is used to adapt 16-port boards with SIVAPAC connectors to shelves with SIPAC connectors.

The installed Adapter 1 makes the 16-port boards protrude from the shelf, a little farther than the 24-port boards. To lock the 16-port boards into position, special latches are provided above (black) and below (gray) the shelf. When the adapters are installed, only the gray latches lock into place.

---

***IMPORTANT:*** The Adapter 1 has three pieces: one power-up module and two adapter modules (see Figure 3).

**Once installed, never remove the board adapters.**

You must install the 16-port adapters manually, as they cannot be installed using the board removal and replacement tool. You cannot use this tool to seat boards with gray latches into place. To remove the boards, follow the instructions in Section 4.1, “Removing 24-Port Boards”.

---

To install the board adapter (see Figure 2 and Figure 3):

1. Release the gray latch in front of the board.
2. Remove the board from the shelf.
3. Face the backplane connector of the board toward yourself.
4. On the adapter module (labeled 1 and 2), slightly pull the catch hooks apart.
5. Position the adapter module over the backplane connector of the board.
6. Ensure that the outer edge of each adapter module corresponds with each outer edge of the board.
7. Ensure that each adapter module's outermost row of pins is aligned with the outermost row of the board connector, then insert the module into the connector.
8. Snap on the catch hooks.
9. Install the other module onto the board connect.

***IMPORTANT:*** If the clearance between the board connector and the hot plug connector on the board is not sufficient for the module catch hook, loosen the two hot plug connector screws on the back of the board and adjust location to allow the catch hook to fit between the hot plug and the board connector.

10. Insert the power-up module (3) into the hot plug connector of the board.

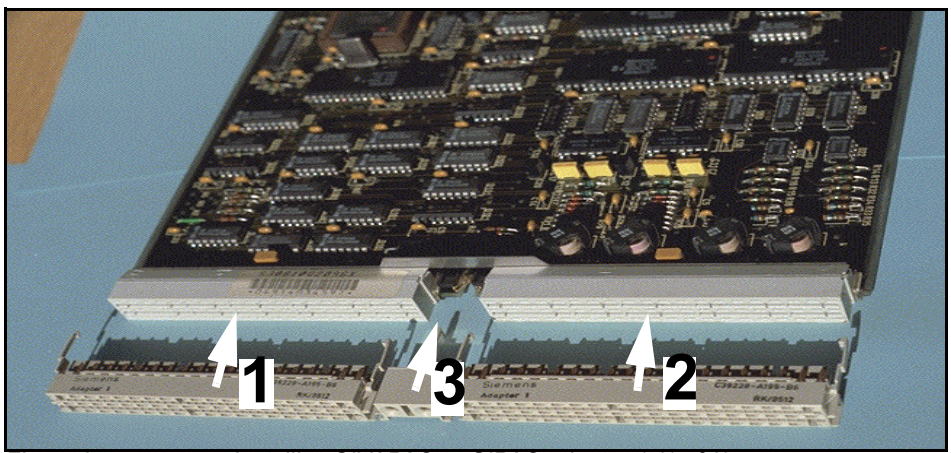


*Figure 2 Installing SIVAPAC-to-SIPAC adapter 1 (1 of 2)*

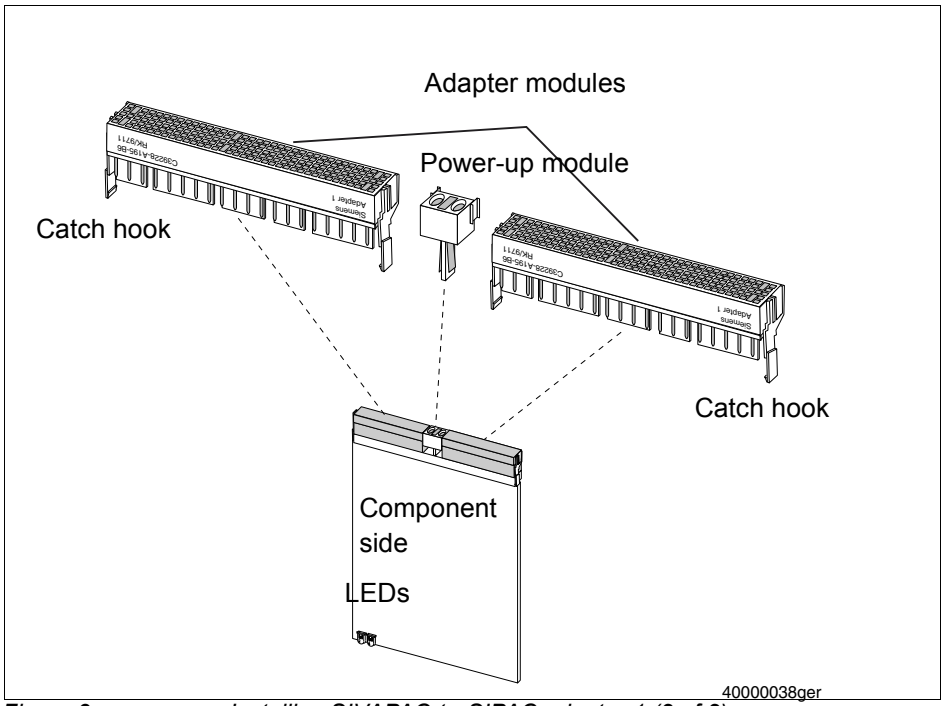


*Figure 3 Installing SIVAPAC-to-SIPAC adapter 1 (2 of 2)*

## 4.1.2 Installing the Adapter 2

An adapter 2 is a SIPAC-to-SIVAPAC board adapter. Use an Adapter 2 to adapt boards with SIPAC connectors to shelves with SIVAPAC connectors.

---

***IMPORTANT:*** The board Adapter 2 comes in three pieces: one power-up module and two adapter modules (see Figure 4).
**Once installed, never remove the board adapters.**

---

To install the board adapter 2 (see Figure 4):

1. Face the backplane connector of the board toward yourself.
2. Insert the power-up module into the middle section of the backplane connector as shown in Figure 4.
3. On the adapter module, slightly pull the catch hooks apart.
4. Position the adapter module over the backplane connector of the board. Ensure that the outer edge of each adapter module corresponds with each outer edge of the board as shown in Figure 4.

5. Ensure that each adapter module's outermost row of pins is aligned with the outermost row of the board connector, then insert the module into the connector.
6. Snap on the catch hooks.
7. If the catch hooks do not correctly lock, the adapter module is incorrectly positioned. Reverse the position of the module and repeat the step.
8. Perform steps 3 through 7 for the other adapter module.

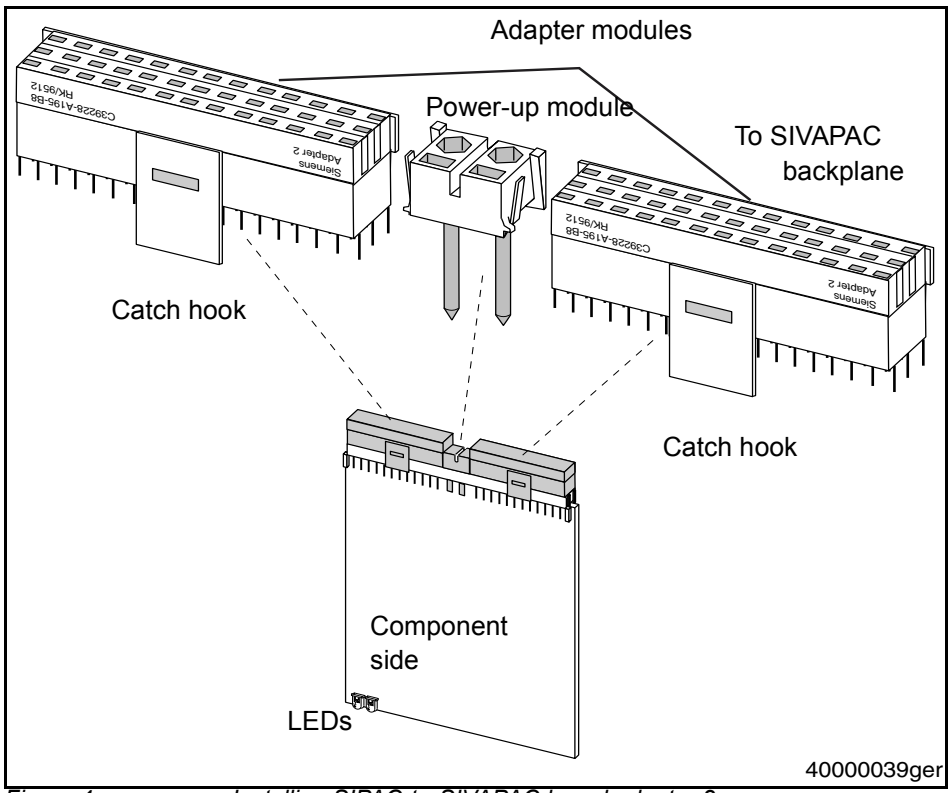


*Figure 4 Installing SIPAC-to-SIVAPAC board adapter 2*

## 4.2 Installing 24DA Splitting Strips on an Old Main Distribution Frame

An old main distribution frame (16DA) can sometimes feature 24DA splitting strips. Proceed as follows in these situations:

1. Fasten a screw on the applicable adapter strap to the left-hand side of the splitting strip, as shown in Figure 5.
2. Fasten a screw on the second adapter strap to the right-hand side of the splitting strip, as shown in Figure 6.
3. Fasten a screw on the left-hand side of the pre-assembled splitting strip to the MDF as shown in Figure 7 (1).
4. Fasten a screw on the right-hand adapter strap of the pre-assembled splitting strip to the MDF (2).

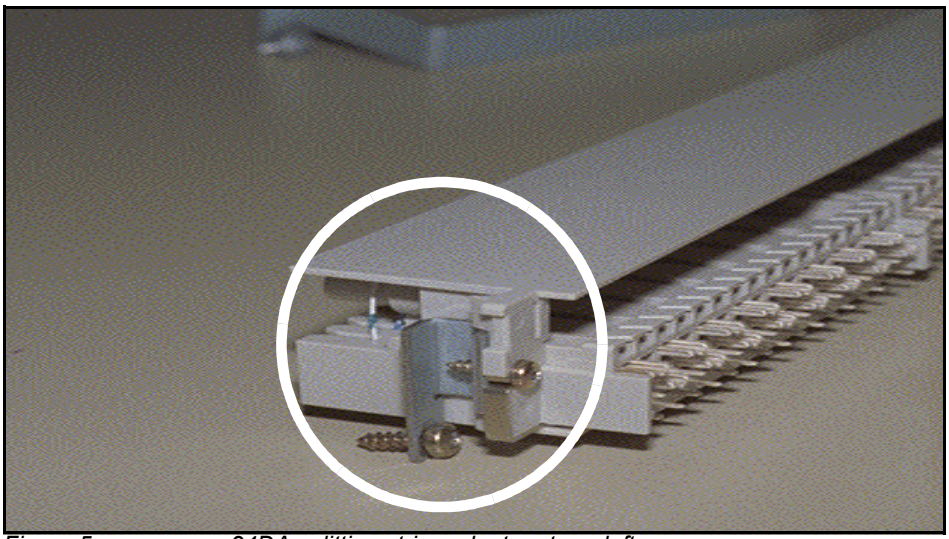

*Figure 5 24DA splitting strips adapter strap, left*

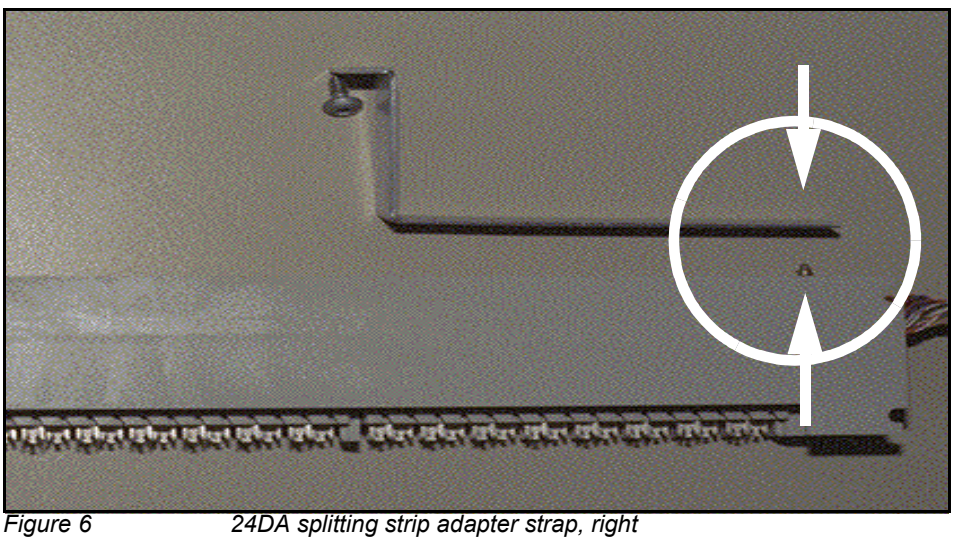

*Figure 6 24DA splitting strip adapter strap, right*

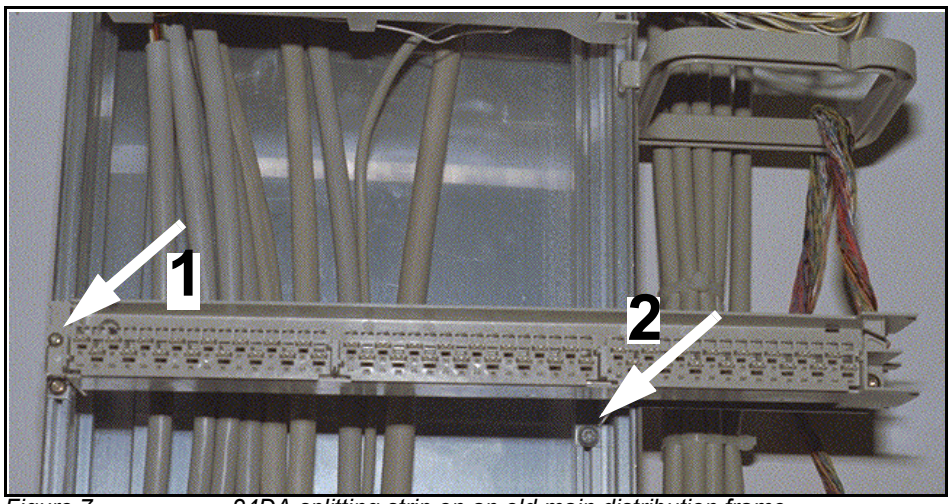


*Figure 7 24DA splitting strip on an old main distribution frame*

## 4.3 Installing AP 3700 Cabinets in 19-Inch Cabinets

When installing a multiple-cabinet system in a 19-inch cabinet, each system cabinet must be installed one at a time.

The following components are needed for installing a system cabinet:

- Two cabinet-specific bearing elbows with an ultimate load > 40 kg supplied by the 19-inch cabinet vendor.
- Two support brackets (order number C39165-A7075-D1), included in the system cabinet scope of delivery.

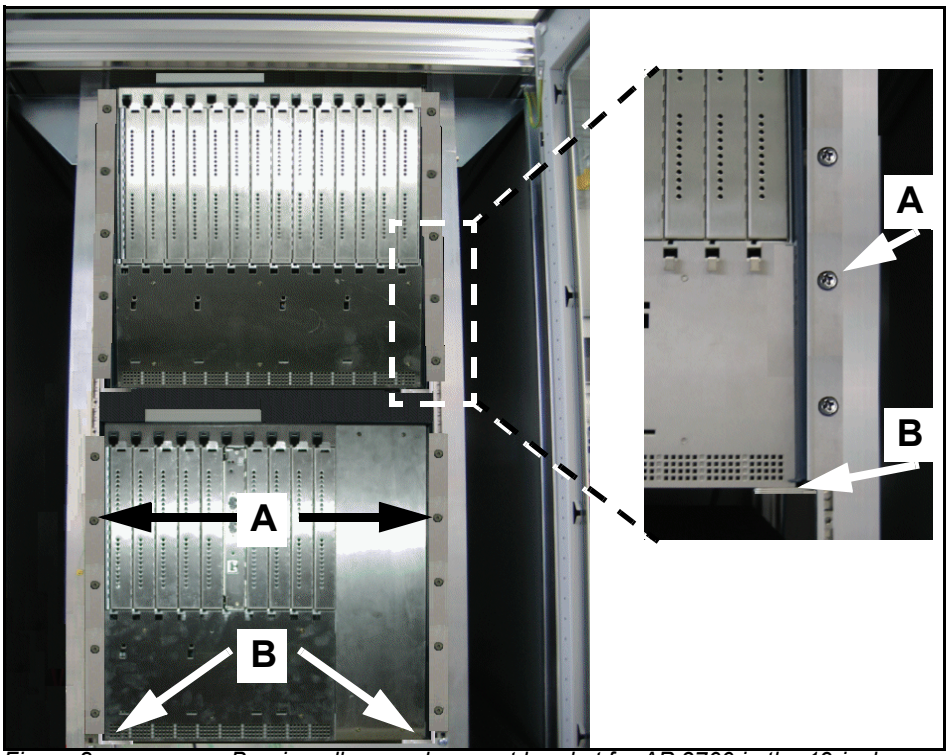


*Figure 8 Bearing elbow and support bracket for AP 3700 in the 19-inch cabinet*

Sequence of installation:

1. Remove all four feet on the system cabinet.
   Do this by loosening the lock nuts (1) on the feet (see Section 3.9, “Leveling the Cabinets”) using an open-ended socket wrench (wrench diameter = 13 mm). Turn the feet completely outwards.
2. Secure both support brackets (A, in Figure 8) to the sides of the system box with four of the screws supplied.
3. Secure a right and left bearing elbow (B, in Figure 8) in the 19-inch cabinet with the screws provided.

4. Lift the system cabinet into the 19-inch cabinet and sit the cabinet on the two bearing elbows (B, inFigure 8). Push the cabinet into the 19-inch cabinet until the front edge of the cabinet is flush with the front of the 19-inch frame.

**CAUTION**

**Risk of injury when lifting heavy objects/loads**
Always seek assistance before lifting a system cabinet into the 19-inch cabinet - never do it on your own.

5. Secure the system cabinet to the frame of the 19-inch cabinet by means of the two support brackets (A, in Figure 8) and the screws provided. Make sure the minimum play specified for the system cabinets is provided (see Section 5.8.3, “AP 3700 Configuration Rules and Examples with 19" Cabinets”).
6. Repeat steps 1 to 5 to install additional expansion cabinets.

## 4.4 Shielding Connection on the Opening of the LTU Frame

***NOTE:*** The shield of all front cables (except network cables and optical fiber cables) must be secured to the frame with two cable ties at the shelf opening.

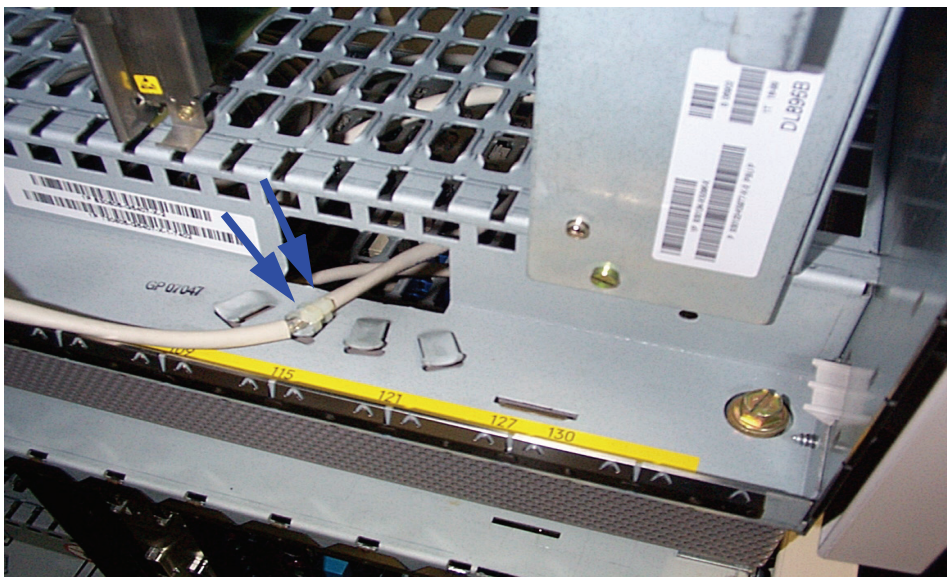


*Figure 9 Securing the cable shield*

***IMPORTANT:*** System cables with pre-stripped sections must be used for LTU frames.

# 5 Installation Variants

This chapter provides schematic representations for the various HIPath 4000 system installations. For illustrations or IPDA installations, refer to the associated chapter. Unless otherwise noted, all illustrations apply to both U.S. and I.M. installations.

## 5.1 Standard Cabinet Installation

This section describes the different ways to install the cabinets depending on the individual requirements of each customer.

***IMPORTANT:*** Each cabinet, including the front cover, forms a shielded unit. Cabinets should be locked while the system is running and the cover should be replaced following testing and maintenance.

### 5.1.1 Single-Cabinet Installation

***IMPORTANT:*** The dimensions shown in these illustrations are minimum dimensions in millimeters (mm).

Figure 1 shows a diagram of a single-cabinet installation.

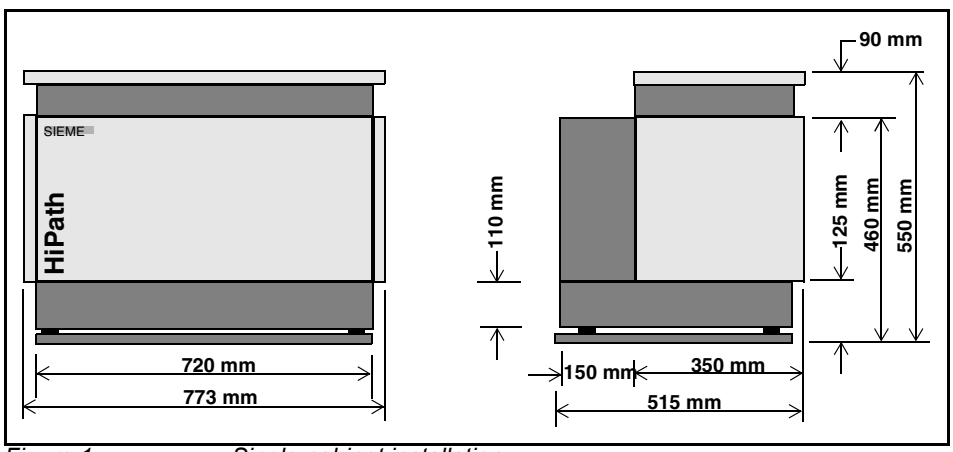


*Figure 1 Single-cabinet installation*

## 5.2 Multiple Cabinet Installation

***IMPORTANT:*** The dimensions shown in the following illustration are minimum dimensions in millimeters (mm).

Figure 2 shows a diagram of a multiple cabinet installation.

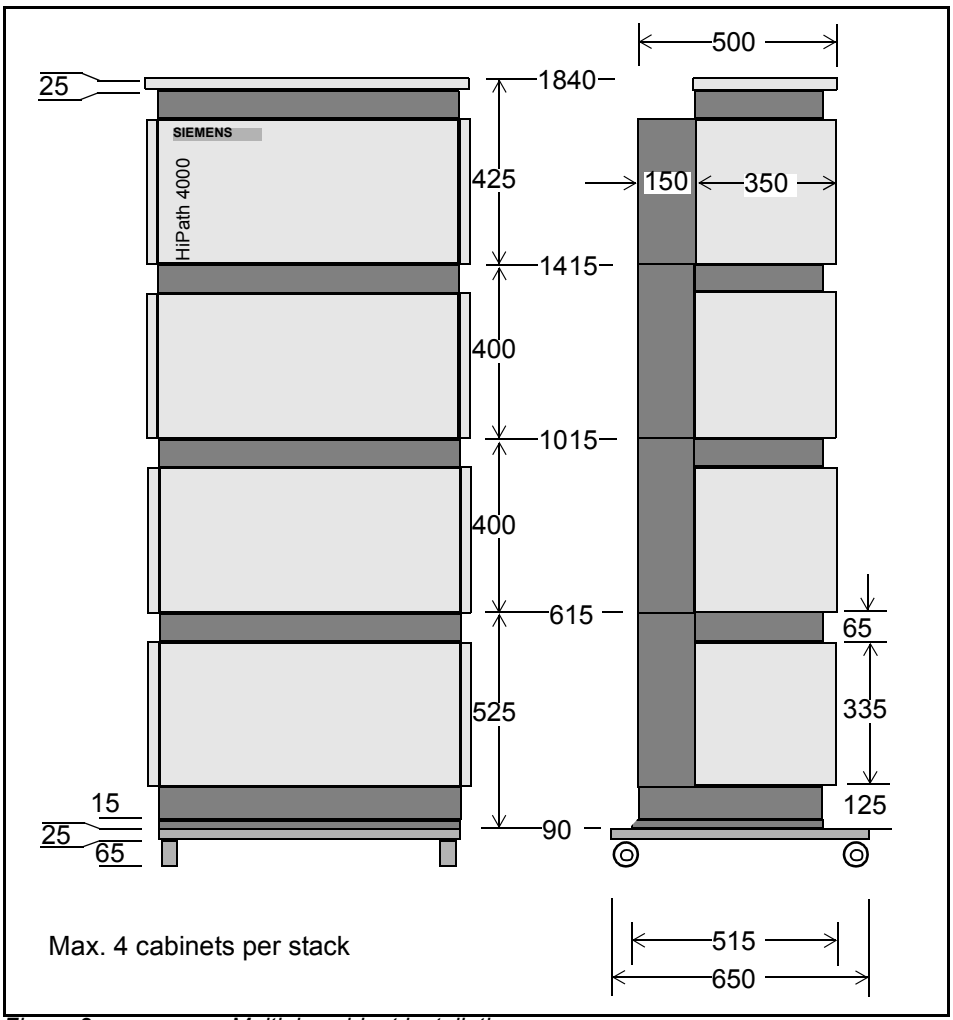


*Figure 2 Multiple cabinet installation*

## 5.3 AC-to-DC Power Box Installation

***IMPORTANT:*** The AC power box is called a unit alternating current distribution (UACD) power supply.

***IMPORTANT:*** The dimensions shown in the following illustration are minimum dimensions in millimeters (mm).

Figure 3 shows the dimensions of the UACD.

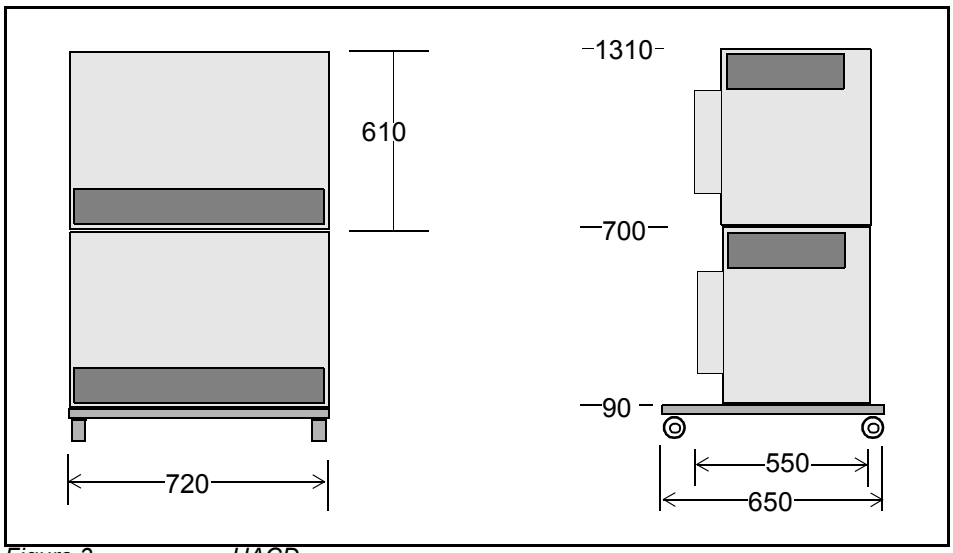


*Figure 3 UACD*

## 5.4 DC-to-DC Power Box Installation

***IMPORTANT:*** The DC power box is known as a unit direct current distribution (UDCD) power supply.

***IMPORTANT:*** The dimensions shown in the following illustration are minimum dimensions in millimeters (mm).

Figure 4 shows the dimensions of a 2-stack UDCD.

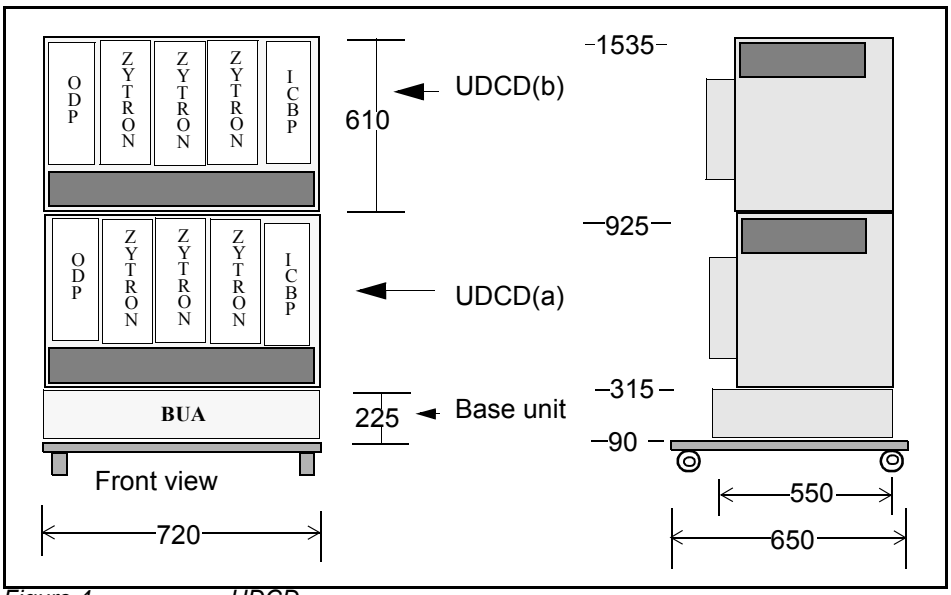


*Figure 4 UDCD*

## 5.5 Free-Standing Installation

***IMPORTANT:*** The CSPCI box, including the front cover, forms a shielded unit. Free slots must be covered.

### 5.5.1 CSPCI Box in UCS Shelf, Stack 1

In this example, the common control cabinet is installed in the UCS shelf of the first stack.

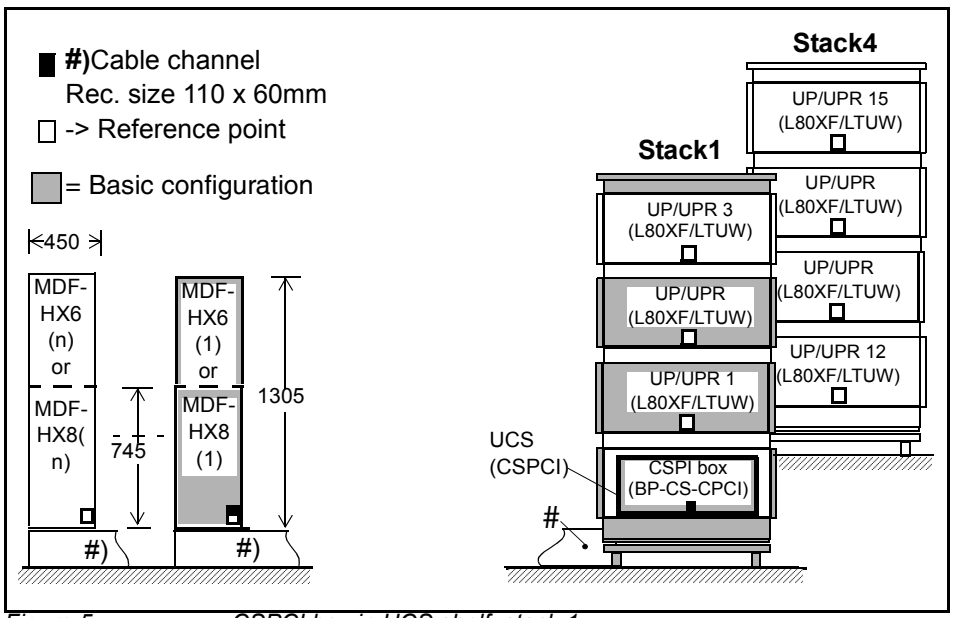


*Figure 5 CSPCI box in UCS shelf, stack 1*

## 5.5.2 CSPCI Box in External 19" Cabinet

In this example, the common control cabinet is installed in a 19" external cabinet.

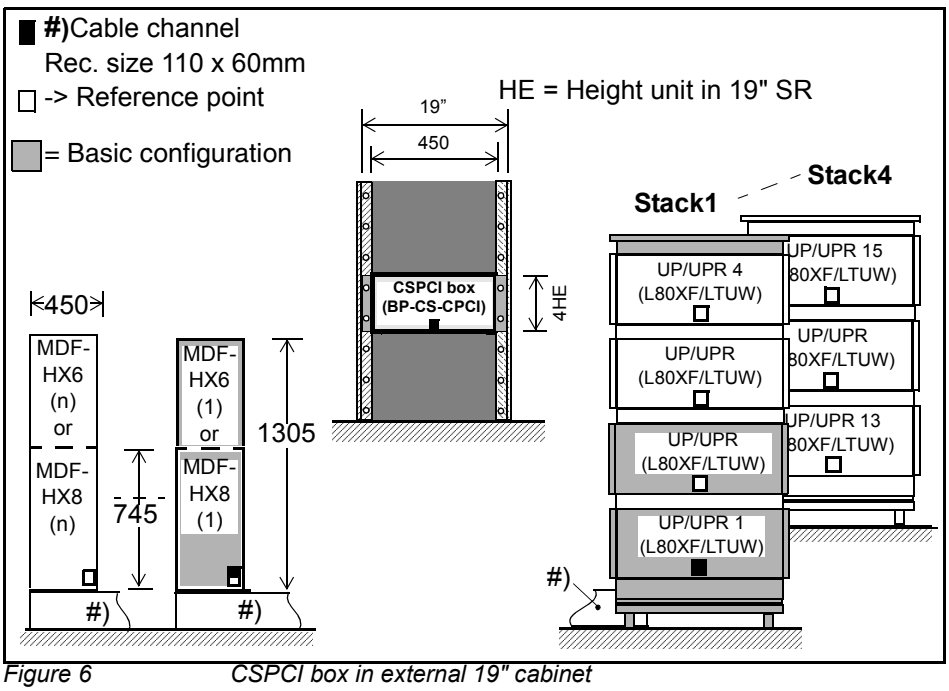


*Figure 6 CSPCI box in external 19" cabinet*

## 5.5.3 HiPath 4000 Free-Standing Installation (Maximum Configuration)

Figure 7 shows a diagram of a free-standing installation (viewed from above). This diagram applies to the U.S. with the exception of the MDF cabinets.

The maximum AC-powered system configuration consists of four 4-stack cabinets and one UACD stack with two power box units.

The maximum DC-powered system configuration consists of four 4-stack cabinets and two UACD stacks with two power box units each.

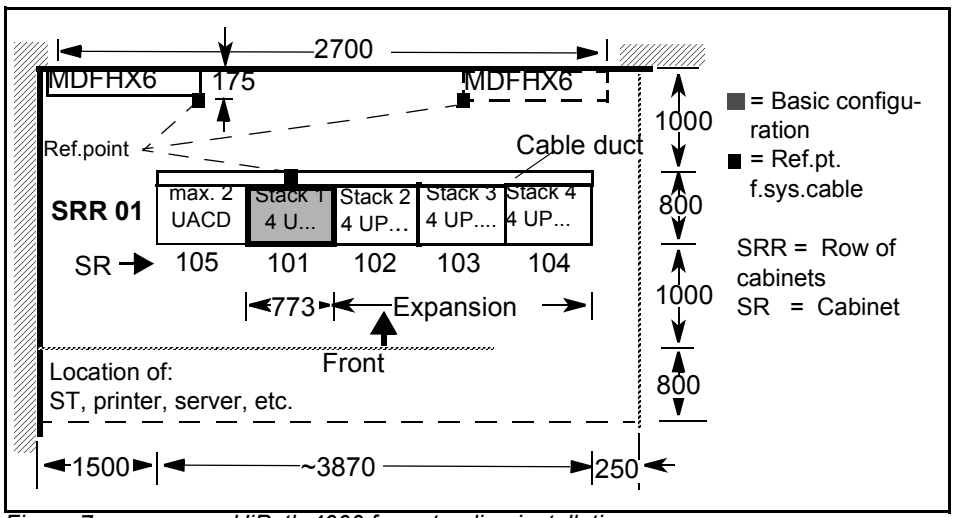


*Figure 7 HiPath 4000 free-standing installation*

## 5.6 Cabling Diagram, I.M.

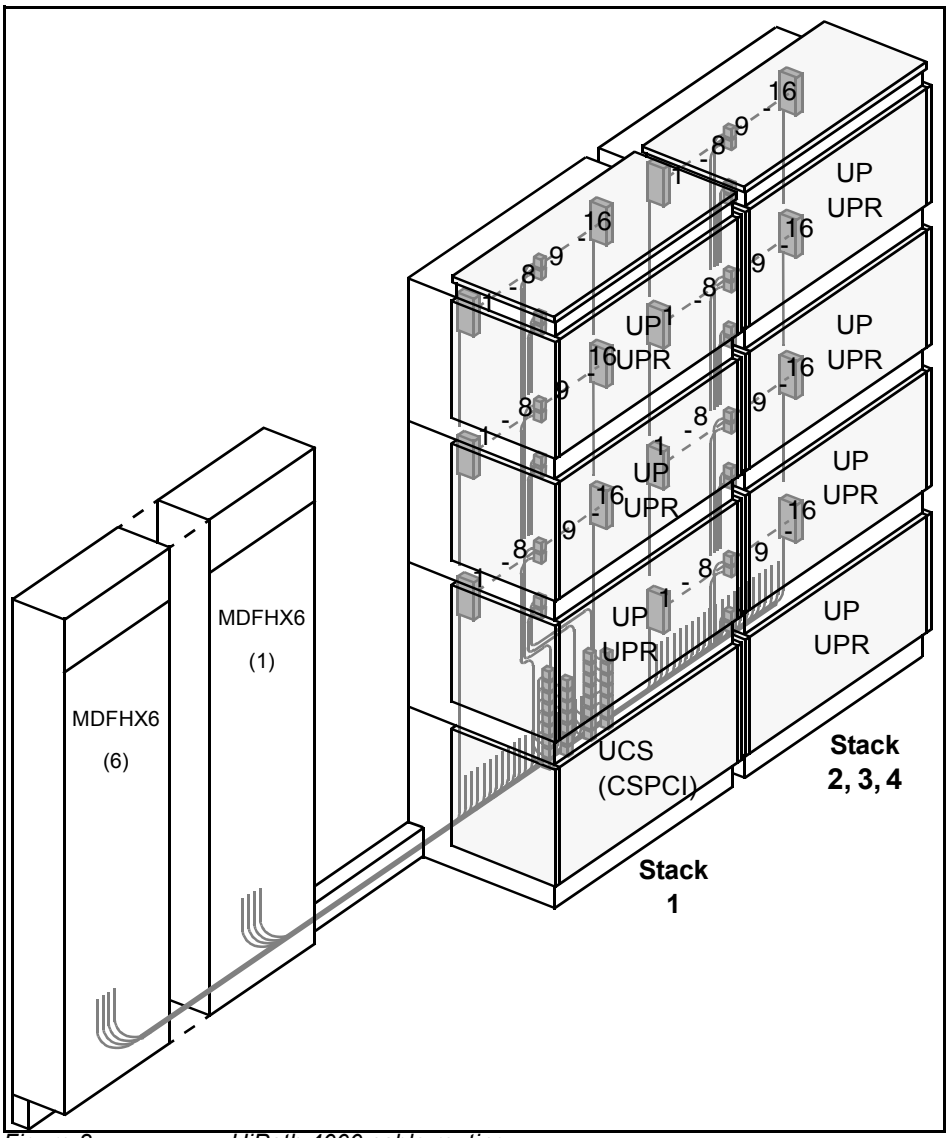


*Figure 8 HiPath 4000 cable routing*

# 5.7 Shelf Configuration

This section shows board and power supply locations on the common control and expansion shelves.

## 5.7.1 CSPCI Box

The CSPCI box is available in "duplex" and "simplex" configurations.

### 5.7.1.1 Duplex Cabinet

| Slot | | Modules | | |
|---|---|---|---|---|
| 6 | | SF2X8 | | |
| 5 | | DSCXL (CC-B) | | |
| 4 | | | | |
| 3 | FAN | HDCF | | FAN |
| 2 | • | DSCXL (CC-A) | | • |
| 1 | | DSCXL (ADP) • | | |
| | | PSU (1) | PSU (2) redundant | |
| | | | | |

• -> Basic shelf configuration extended with:

**2 x DSCXL:** S30810-Q2311-X
**SF2X8:** S30810-Q2309-X
**RTM :** S30810-Q2312-X (back)

### 5.7.1.2 Simplex Mono Cabinet

| Slot | | Modules | |
|---|---|---|---|
| 6 | | | |
| 5 | | | |
| 4 | | | |
| 3 | FAN | HDCF • | FAN |
| 2 | • | | • |
| 1 | | DSCXL (ADP) • | |
| | | PSU (1) • / PSU (2) redundant | |
| | | | |

- -> Modules belong to basic shelf configuration:

**PSU:**ACPCI/DCPCI
**Fan:**C39165-A7050-B13
**DSCXL:** S30810-Q2311-X
**RTM:** S30810-Q2312-X
**MCM:** S30810-Q2313-X
**HDCF:** S30810-K2319-X300

## 5.7.2 UPR Cabinet

***IMPORTANT:*** The unit peripheral redundant (UPR) cabinet is otherwise known as the LTUW cabinet.

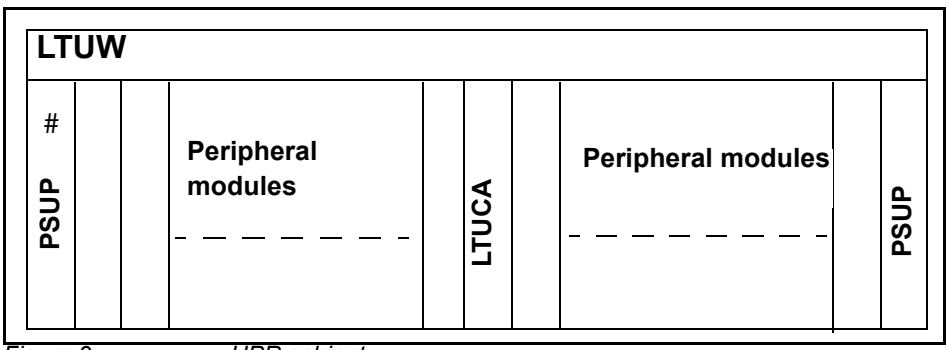


*Figure 9 UPR cabinet*

## 5.7.3 Unit Peripheral Nonredundant Cabinet

***IMPORTANT:*** The unit peripheral nonredundant (UP) cabinet is otherwise known as the L80XF cabinet.

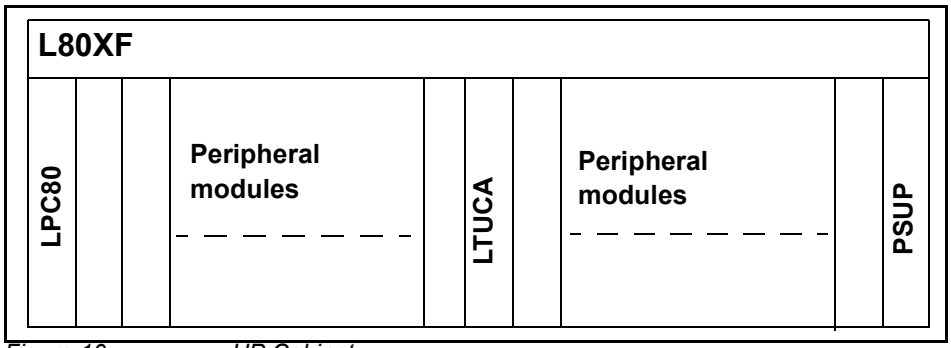


*Figure 10 UP Cabinet*

## 5.7.4 AP 3700-9

Part number: S30805-G5412-X

**Component placement (front side)**

- Slot 1-5: Peripheral boards
- Slot 6: Common control unit NCUI2 (AP3700-9)
- Slot 7-10: Peripheral boards
- Max. 3 LUNA 2 power supplies

***IMPORTANT:*** Only two power supplies are needed. The third LUNA2 is used for a redundant power supply.

- CompactPCI cassette (Survivability Server), only used in AP 3700-9 (HiPath 4000)

***IMPORTANT:*** This Compact PCI cassette can be installed in the shelves as an optional emergency server (Survivability Server).

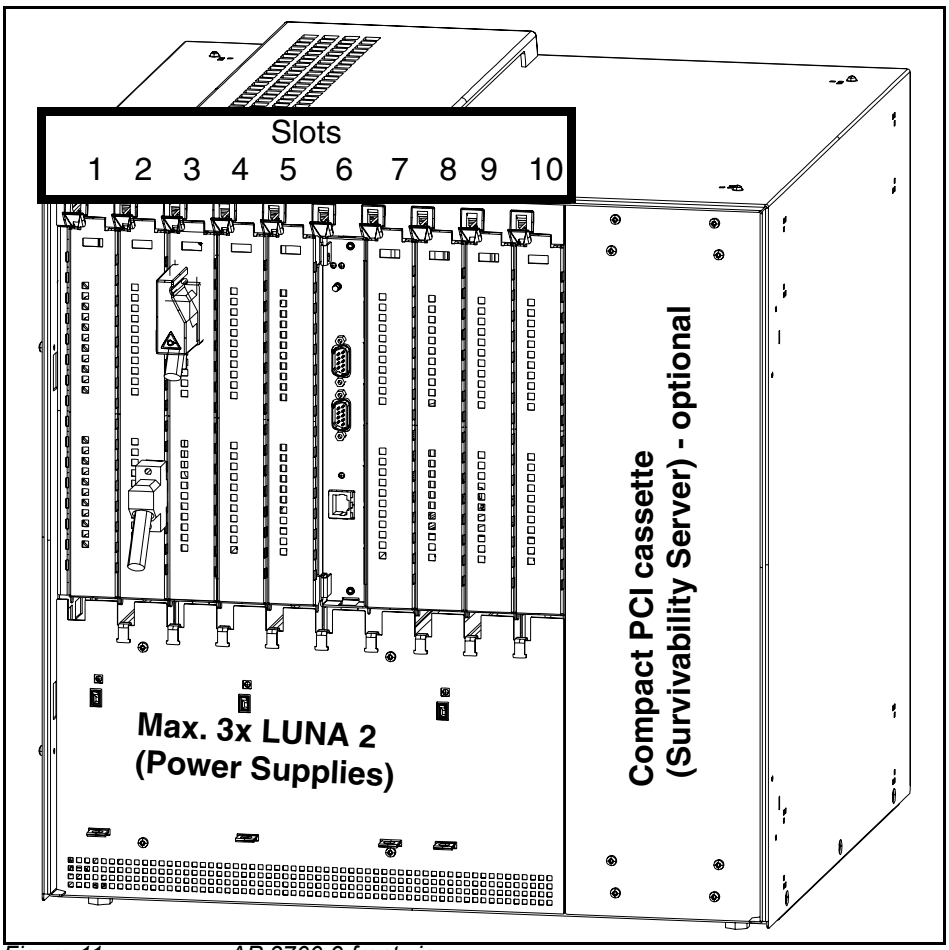


*Figure 11 AP 3700-9 front view*

**Component placement (back side) with patch panels**

- Slot 10-7: Patch panels (8-, 20- and 24-port RJ45 connectors/CHAMP connectors)
- Slot 6: Board for power connection (DC above/AC below)
- Slot 5-1: Patch panels (8-, 20- and 24-port RJ45 connectors/CHAMP connectors)

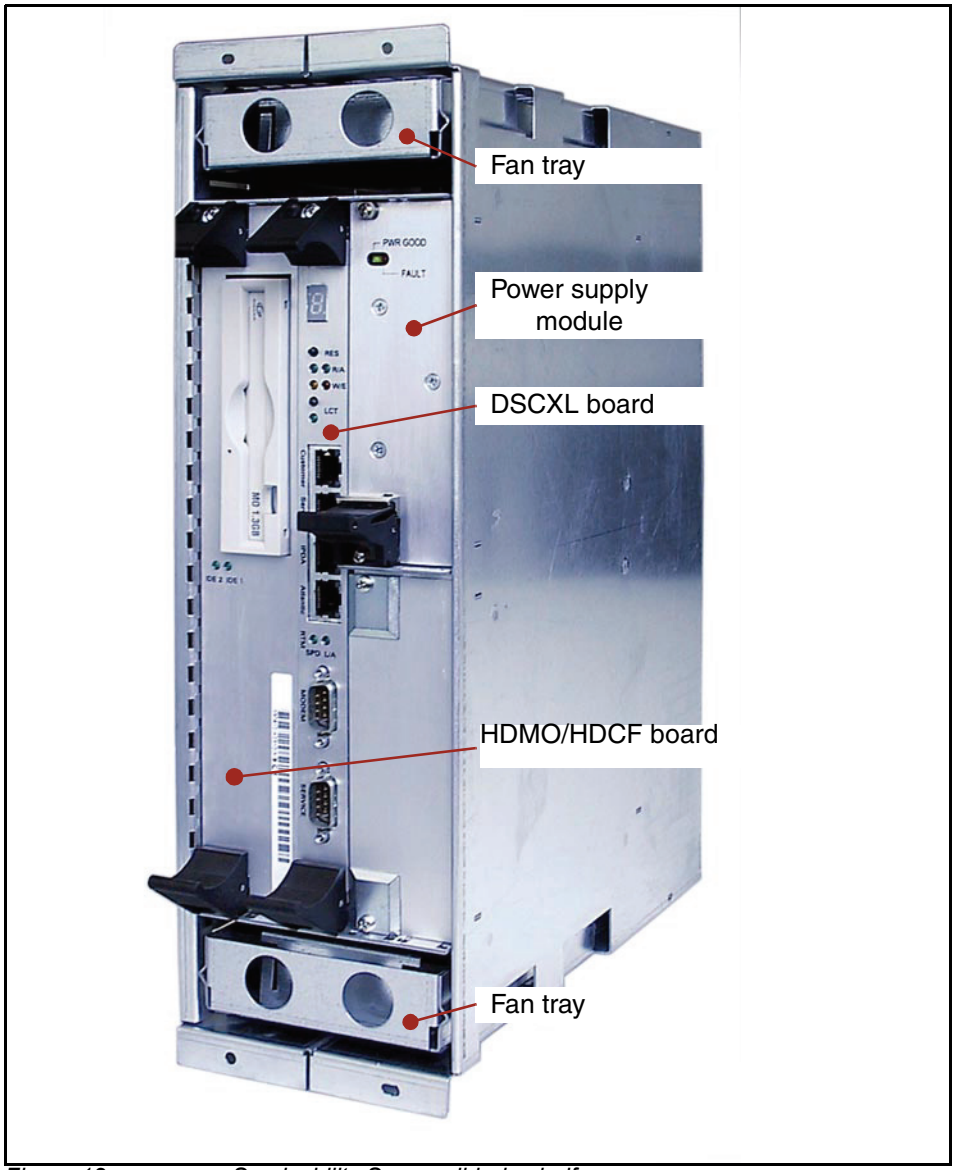


*Figure 12 Survivability Server slide-in shelf*

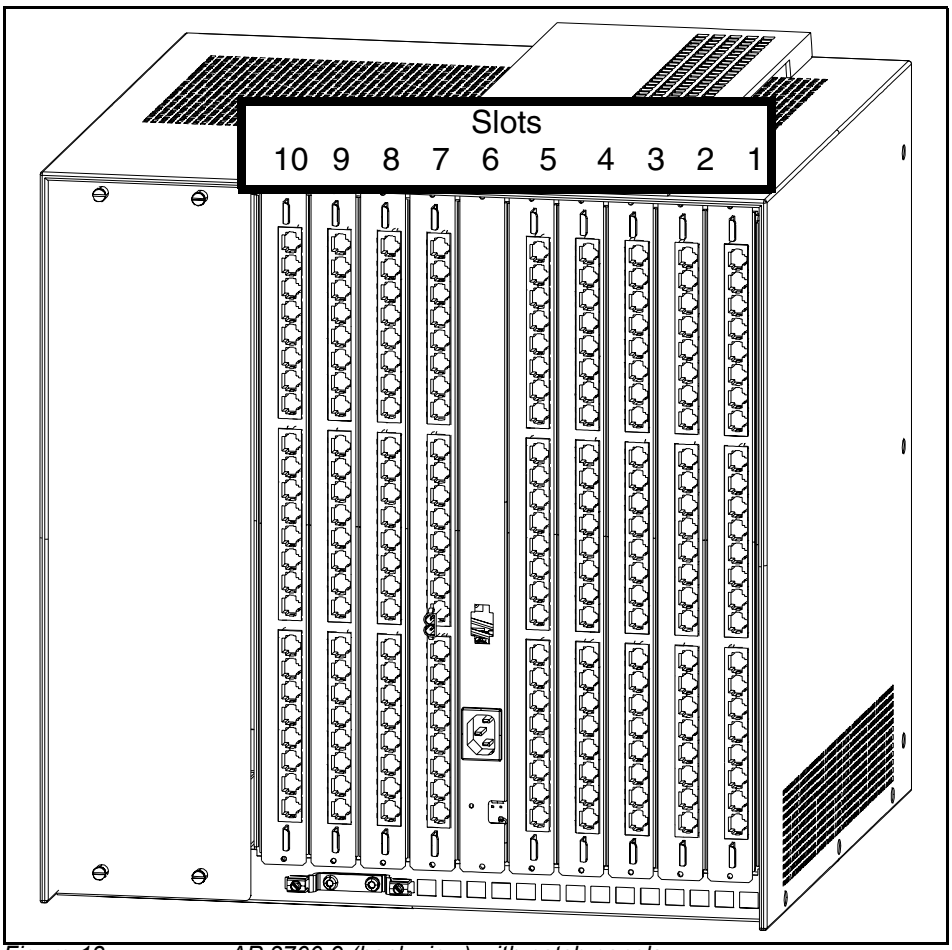


*Figure 13 AP 3700-9 (back view) with patch panels*

## 5.7.5 AP 3700-13 (Expansion Cabinet)

Part number: S30805-G5413-X

**Component placement (front side)**

- Slot 1-6: Peripheral boards
- Slot 7: Central control board LTUCA (AP3700-13)/with (H3800BB) not occupied
- Slot 8-14: Peripheral boards
- max. 4 LUNA 2 power supplies

---

***IMPORTANT:*** Only three power supplies are needed. The fourth LUNA2 is used for a redundant power supply.

---

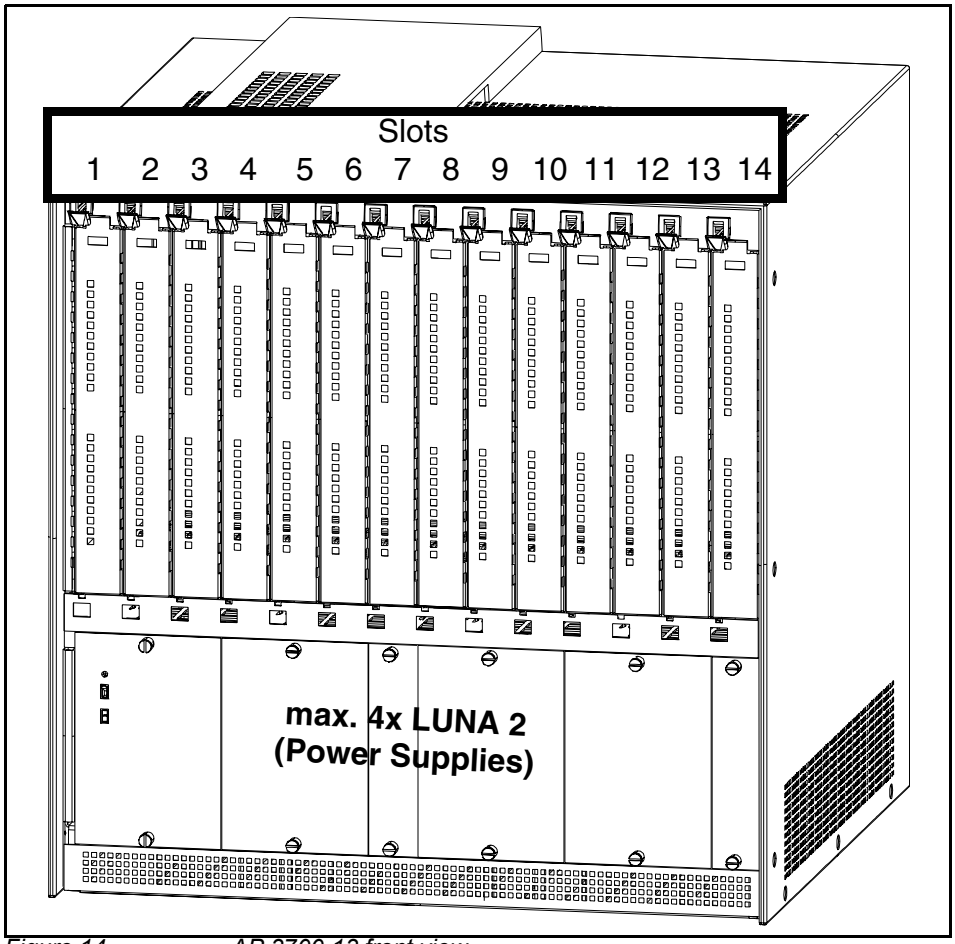


*Figure 14 AP 3700-13 front view*

**Component placement (back side) with patch panels**

- Slot 14-8: Patch panels (8-, 20- and 24-port RJ45 connectors/CHAMP connectors)
- Slot 7: Board for power connection (DC above/AC below)
- Slot 6-1: Patch panels (8-, 20- and 24-port RJ45 connectors/CHAMP connectors)
- Ground connector

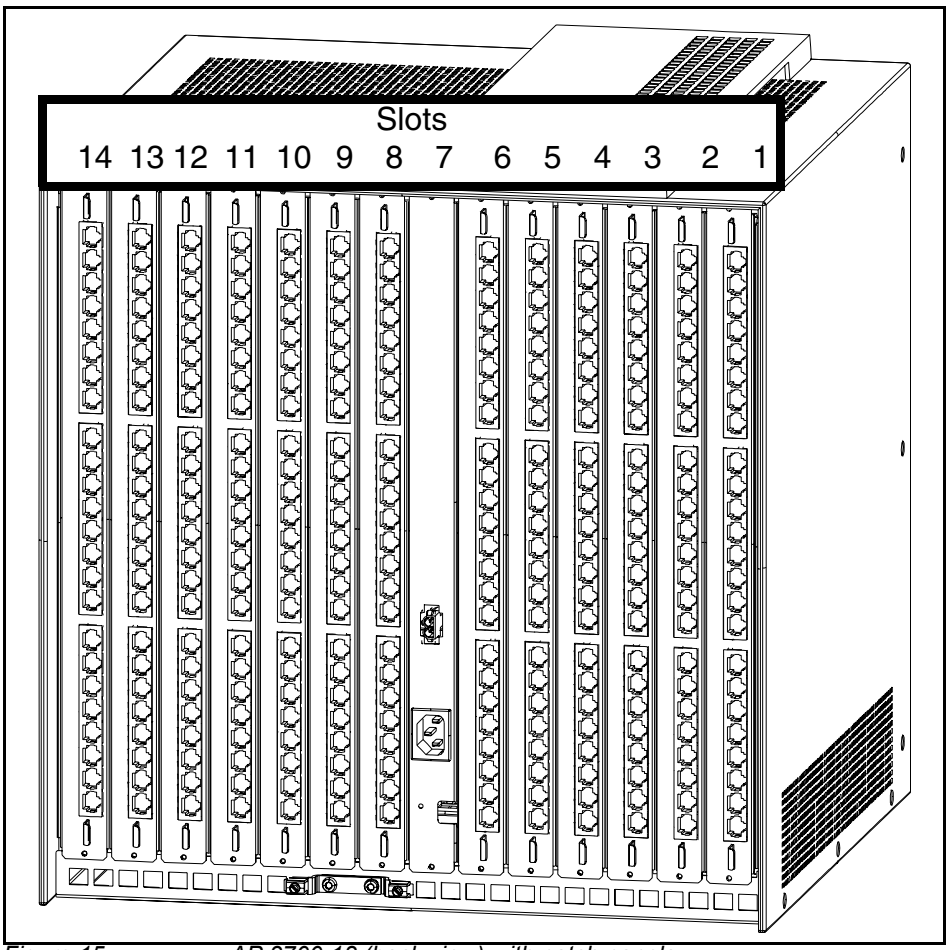


*Figure 15 AP 3700-13 (back view) with patch panels*

### 5.7.6 Redundant Power Box Stacks

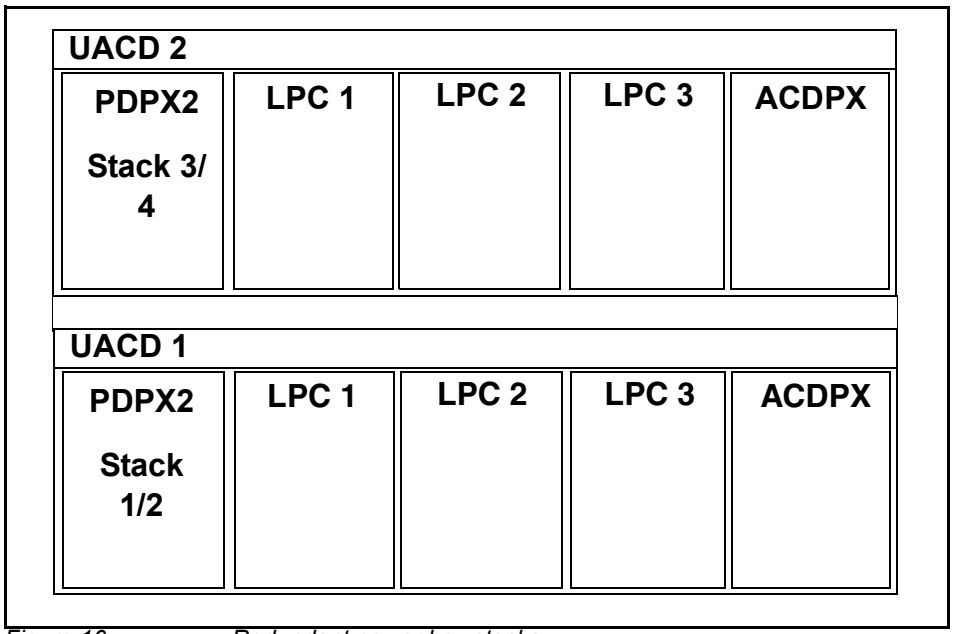


*Figure 16 Redundant power box stacks*

## 5.8 Installation with AP 3700 Cabinets

Depending on the system configuration, the following connections are possible when adding AP 3700 cabinets to a HiPath 4000 system.

### 5.8.1 Connecting AP 3700-9 to L80XF/LTUW

In this example, an AP 3700 base cabinet with 9 peripheral boards is connected to a HiPath 4000 V4.0 system.

Using an NCUI4 board, the AP 3700 base cabinet is connected to an STMI4 board on an L80XF or LTUW shelf in a HiPath 4000 system (see Figure 17).

### 5.8.2 Connecting AP 3700-13 to CSPCI

In this example, an AP 3700 expansion cabinet with 13 peripheral boards is connected to a HiPath 4000 system. This expansion can only be done with a 19" cabinet.

The connection is via a cable from the RTM board on the CSPCI shelf to the LTUCA board in the expansion cabinet (see Figure 17).

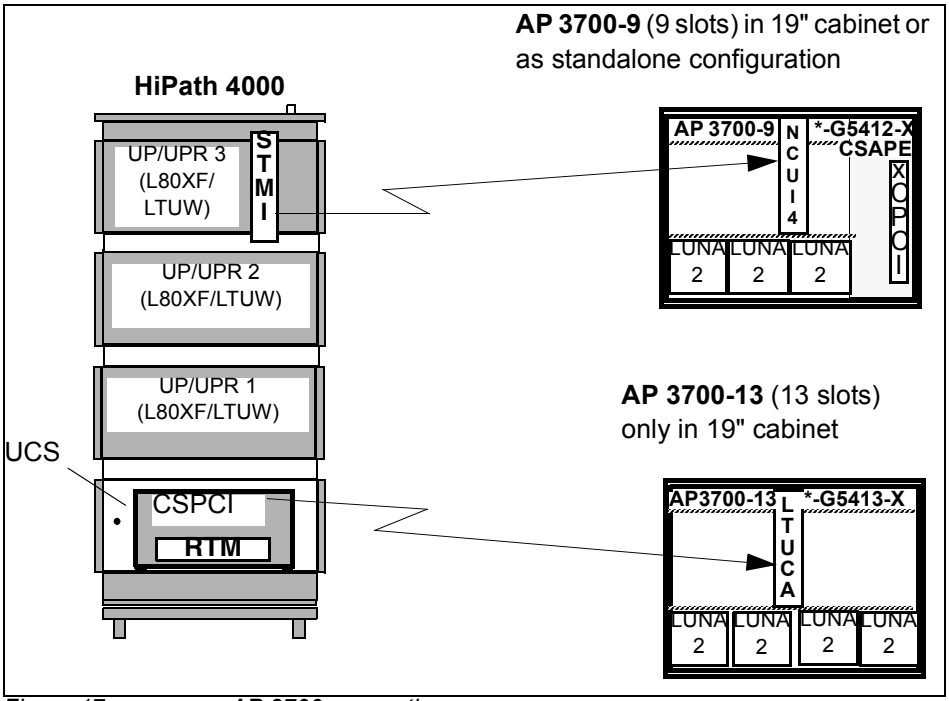


*Figure 17 AP 3700 connections*

## 5.8.3 AP 3700 Configuration Rules and Examples with 19" Cabinets

The rules apply to the installation of the CSPCI, AP 3700 IP, AP 3700 components and DCDR in standard commercial 19" cabinets.

### 5.8.3.1 Suitable Cabinet Models

The standard commercial 19" cabinets used for server and network applications in the IT sector are suitable for installing the HiPath 4000 components.

The elements installed in the cabinet must be accessible from the back and front.

Cabinets that allow 19-inch components to be installed from the back and front should be used (>= 4 vertical struts).

In accordance with the relevant vendor’s selected rack program, the following parts and devices must/can be obtained from the rack vendor:

- Fixing screws/material for installing devices/cabinets;
- Sliding rails/support rails;
- Wire feeding elements and cable management;

- Multiple socket busbars/outlets;
- Distribution cabinets/elements and patch panels for LAN connections;
- Fan unit(s) incl. connecting cables;
- Other accessories, for example, additional angles, shelves (ensure air permeability), C-rails, etc.

In line with the planned configuration, cabinets with the appropriate number of rack units (Us, 1 U = 44.45 mm) should be selected.

A typical cabinet width of 700 mm ...800 mm and height of at least 600 mm is recommended. Greater cabinet depths (800 mm ...900 mm) make installation easier and cable management more convenient and also allow more components to be installed at the back of the cabinet. The space between the cabinet rows should typically be the same as the width of the cabinet.

If AP 3700 IP and AP 3700 boards are to be installed, the cabinet must have sliding rails/supporting rails with a minimum load-bearing capacity of 40 kg.

The sliding rails can be obtained from the rack manufacturer.

The 19" installation brackets supplied should be used to fix the components to the cabinet struts.

To ensure sufficient heat removal, the cabinets should be arranged in accordance with the following sample configurations.

CSPCI requires 4 HEs and should preferably be placed in the bottom of the rack. Enough space should be allowed for ventilation (air drawn in from the left, air escapes on the right).

The AP 3700-*  requires 11 HEs (10 HEs + free space).

Two AP 3700-* boards can be installed without mandatory ventilation (without a fan unit).

If there are more than two AP 3700-* boards, a 19" fan unit (1 U) must be used.

Ventilation should be provided across the whole area.

The required air flow rate of at least 600 m3/h should be ensured.

If necessary, it is possible to install a second fan unit (if redundancy is desired but not mandatory).

A minimum clearance of 2 HEs should be allowed between the CSCPI and the AP 3700-* board

The cabinets should be chosen and configured so that there is sufficient air circulation.

---

***IMPORTANT:*** As the individual cabinets already satisfy EMC requirements, the use of shielded racks is not necessary.

---

19" connector strips in the appropriate country-specific version should be provided for connection to the AC power supply (230V or 115 V).

Power requirement for CSPCI: 4A/115V  2A/230V

Power requirement for AP 3700 IP:  6A/115V,  3A/230V

Power requirement for AP 3700: 8A/115V,  4A/230V

Power requirement for survivability unit: 4A/115V,  2A/230V

Power requirement for fan unit: see manufacturer’s information

In the case of DC systems (48V), you must ensure that a fused 16 A connection is used.

Grounding must be performed in a star shape from the external earth bar to the rack (min. cross-section $10^2$). All ground wires in the rack should be routed to the to the central ground connection point in the relevant cabinet. The cabinets should be connected to each other using ground wires. DC power lines must be shielded for EMC reasons.

The shielding should be removed on both sides.

### 5.8.3.2 Sample Configuration AP 3700 or AP3700 IP in a Cabinet with 25 Rack Units

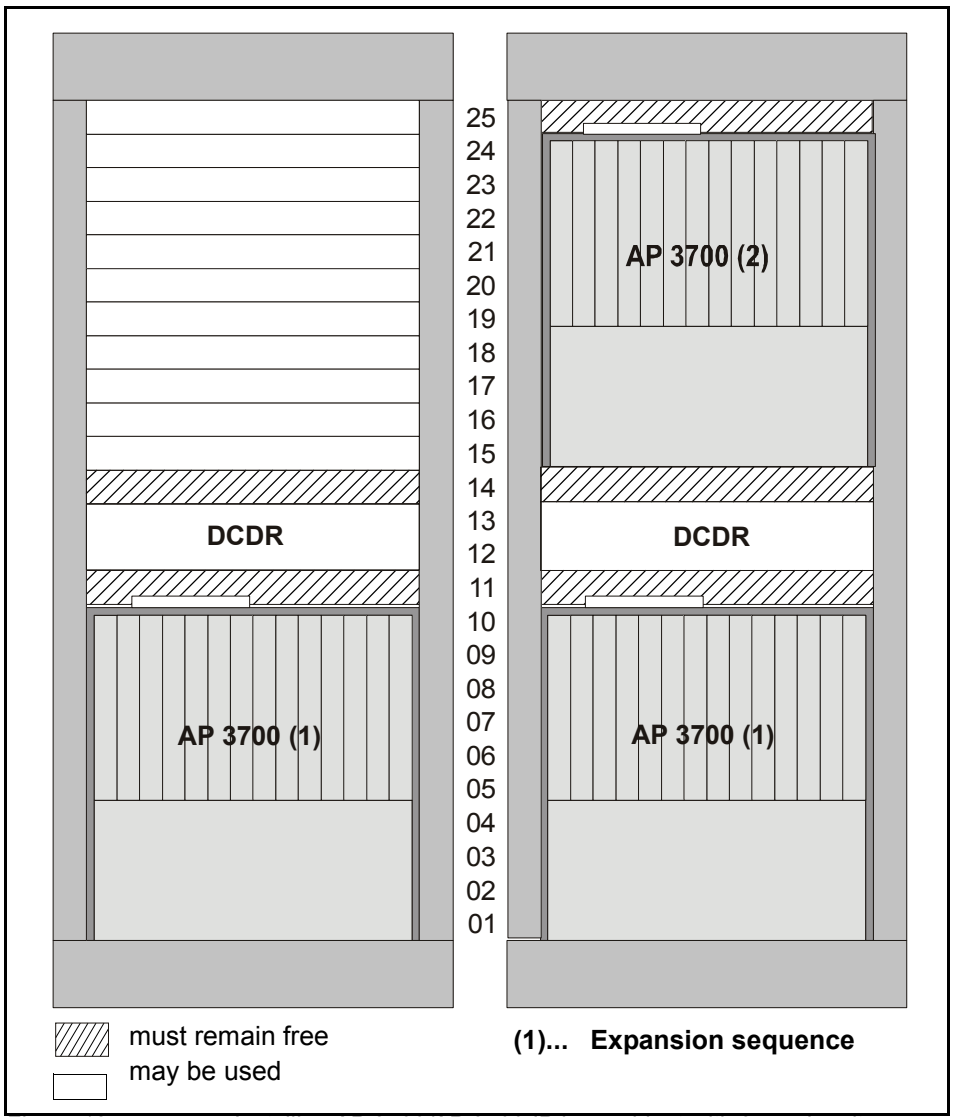


*Figure 18 Installing AP 3700/AP 3700 IP in a cabinet with 25 rack units*

### 5.8.3.3 Sample Configuration CSPCI with AP 3700 in a Cabinet with 37 Rack Units

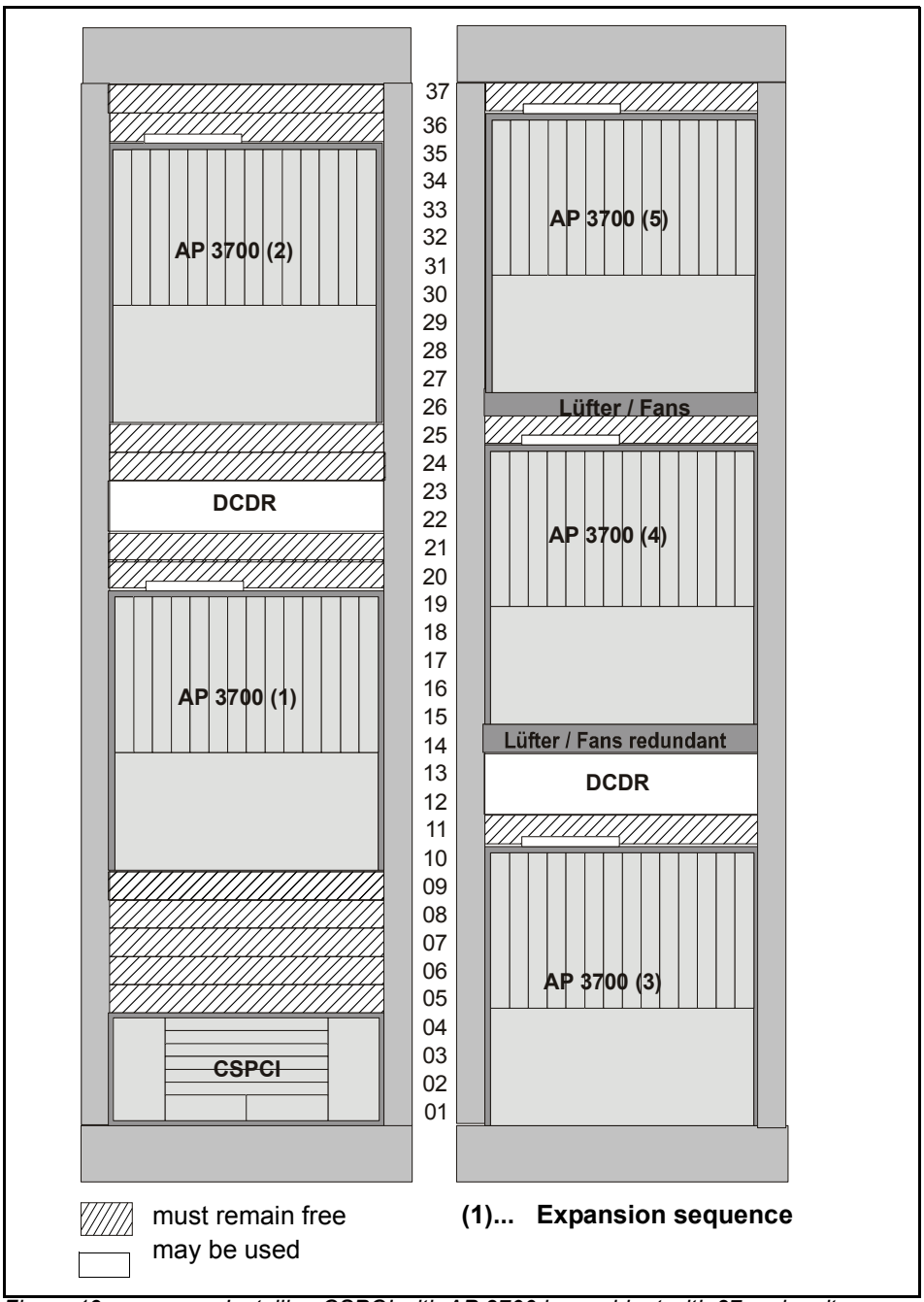


*Figure 19 Installing CSPCI with AP 3700 in a cabinet with 37 rack units*

### 5.8.3.4 Sample Configuration CSPCI with AP 3700 in a Cabinet with 42 Rack Units

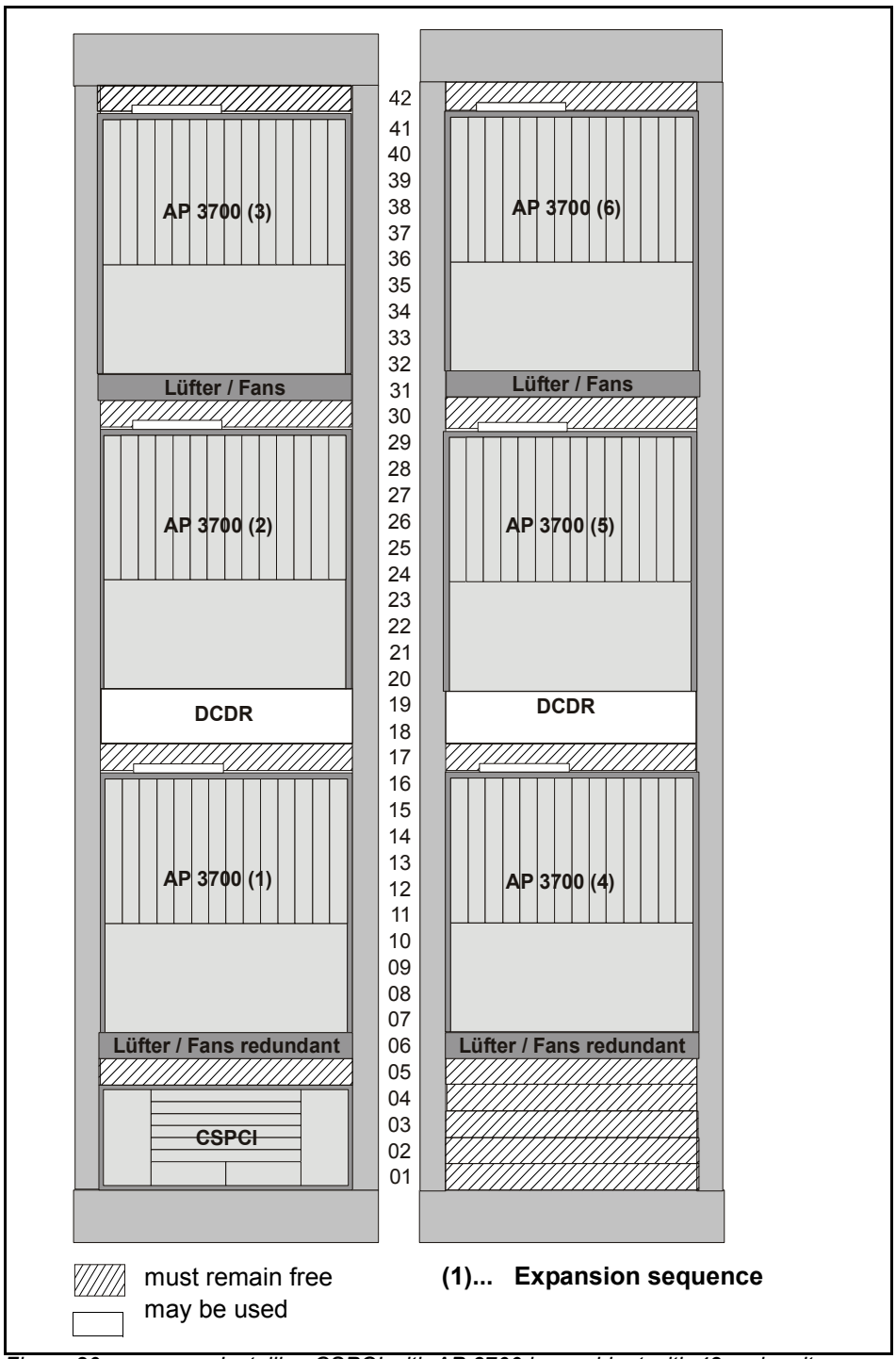


*Figure 20 Installing CSPCI with AP 3700 in a cabinet with 42 rack units*

### 5.8.3.5 Sample Configuration CSPCI with AP 3700 in a Cabinet with 47 Rack Units

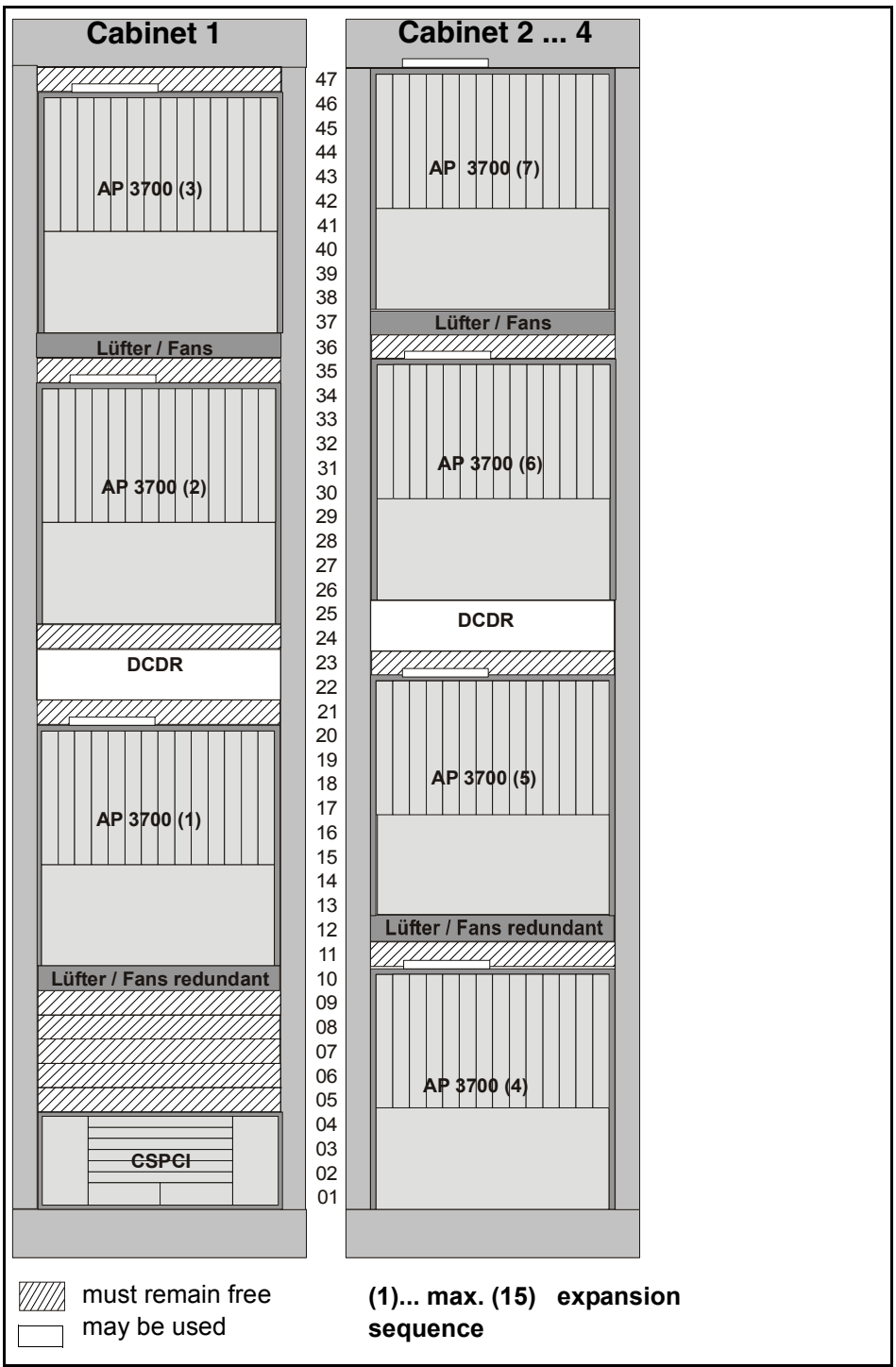


*Figure 21 Installing CSPCI with AP 3700 in a cabinet with 47 rack units*

## 5.9 MDFHX 6 Mounting Location, I.M.

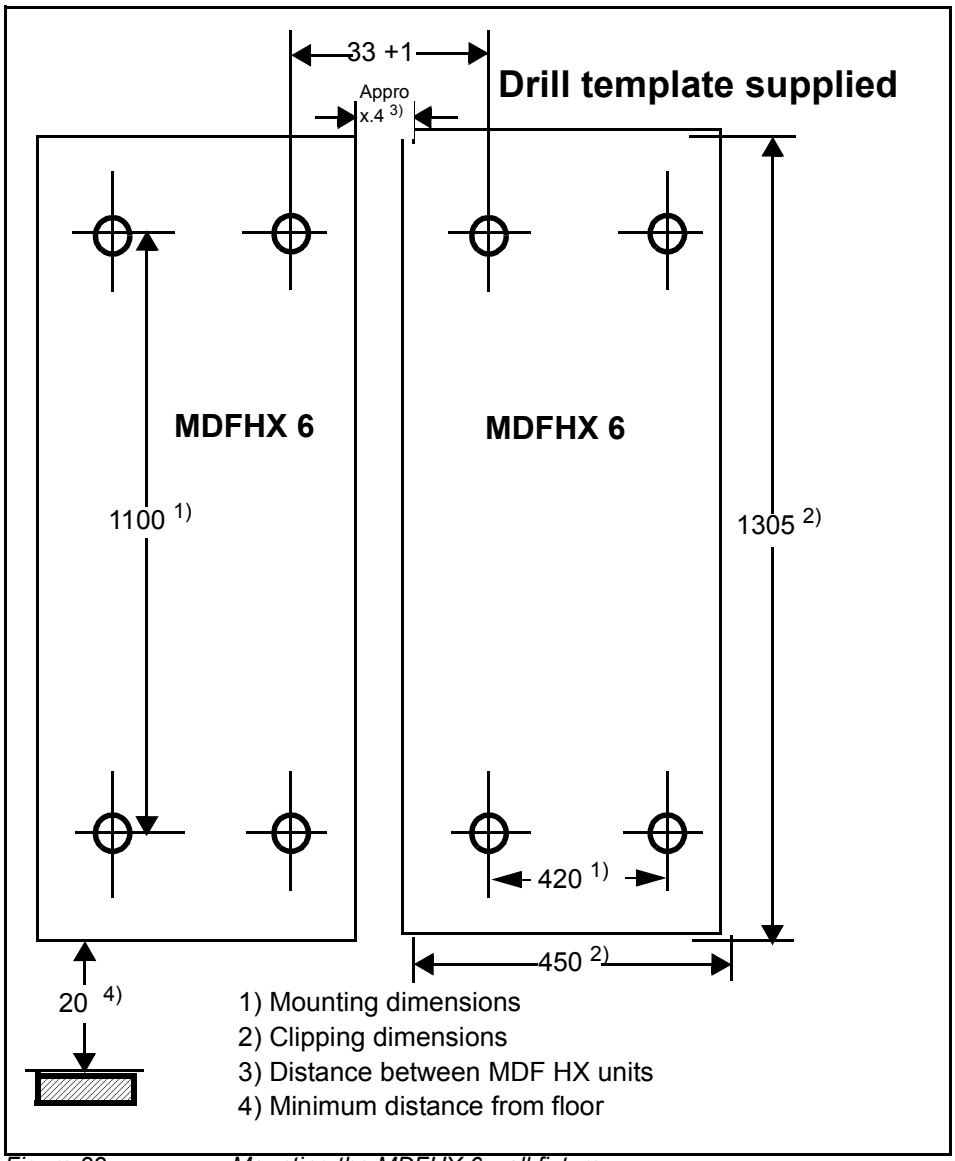


*Figure 22 Mounting the MDFHX 6 wall fixture*

## 5.10 MDFHX 8 Mounting Location, I.M.

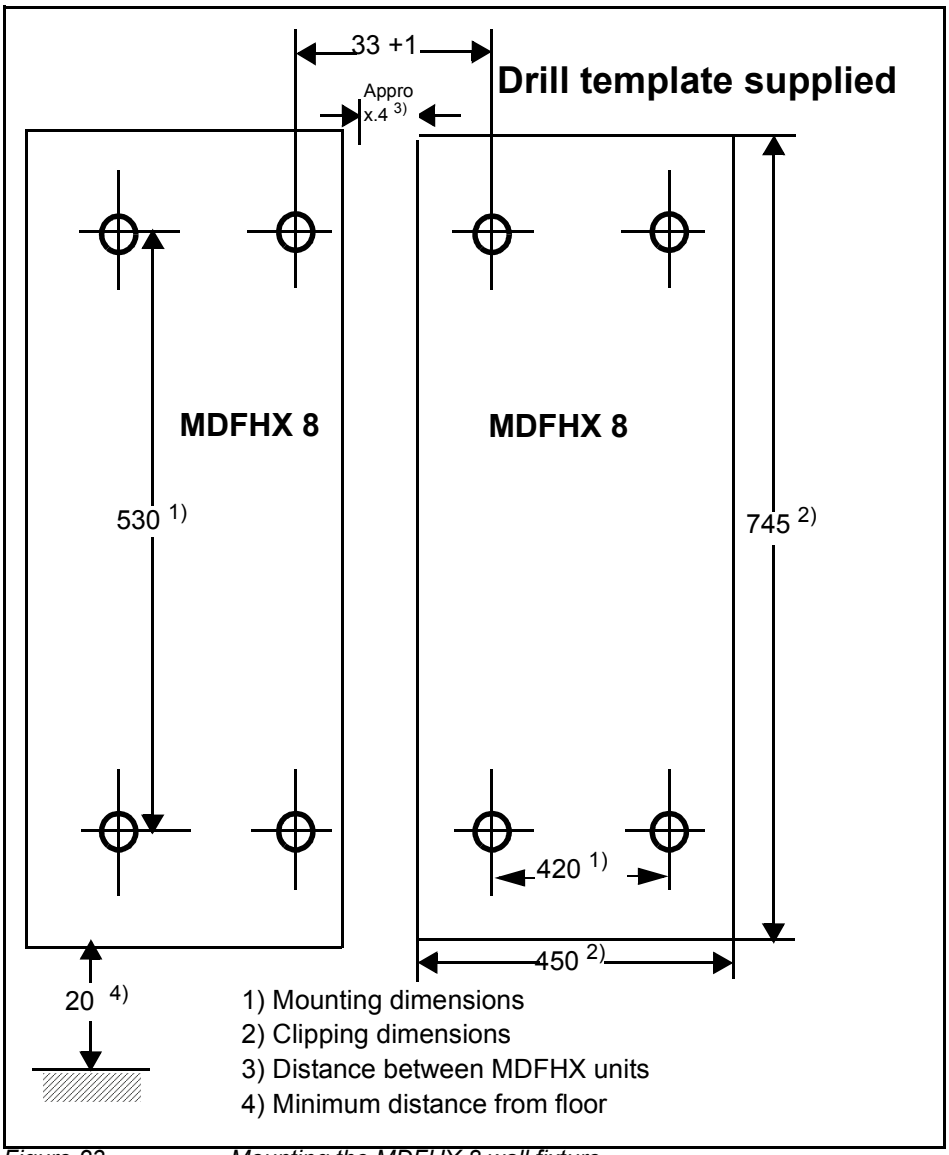


*Figure 23 Mounting the MDFHX 8 wall fixture*

# 6 Grounding the HiPath 4000

This section describes instructions for grounding the main distribution frame (MDF) and the system.

***IMPORTANT:*** Implementation regulations based on IEC 60364 and 60950-1 should be observed during installation. Chapter 1, "Connection to the Power Supply" should also be observed.

## 6.1 Grounding the MDF, I.M.

***NOTE:*** In undefined main distribution frames (external distributors), you must connect the ground of the base cabinet (CSPCI) and the main distribution frame directly to the ground busbar. In this instance, you must not connect a ground connection directly from the main distribution frame to the base cabinet.

To ground the MDF:

1. Connect the ground connector (green/yellow) from the ground busbar (building ground) to terminal connection (1) of the first main distribution frame (see Figure 1).

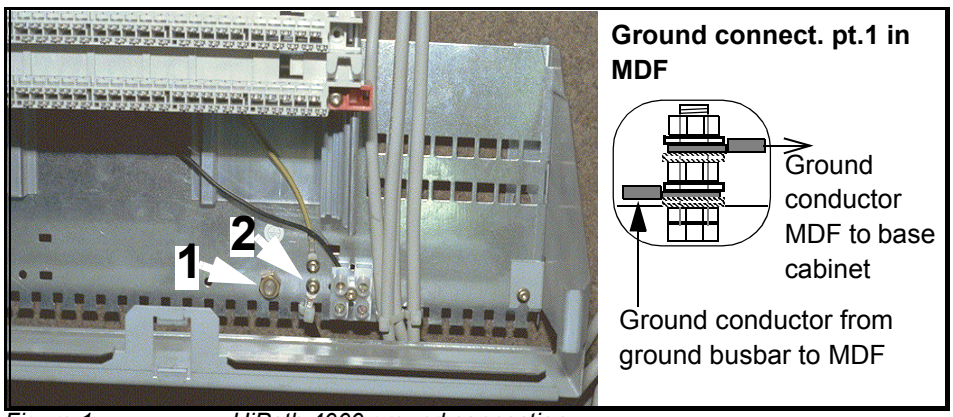


*Figure 1 HiPath 4000 ground connection*

2. If several main distribution frames are installed, connect a second ground conductor to the terminal connection (2) of the first main distribution frame (see Figure 1) and connect this line to terminal connection point 2 of the second main distribution frame.

   Repeat this procedure, if necessary, from main distribution frame 2 to 3 and 4.

## 6.2 Connecting and Grounding the Cabinets

Figure 2 shows the placement of the connecting plate assemblies (straps) for grounding purposes.

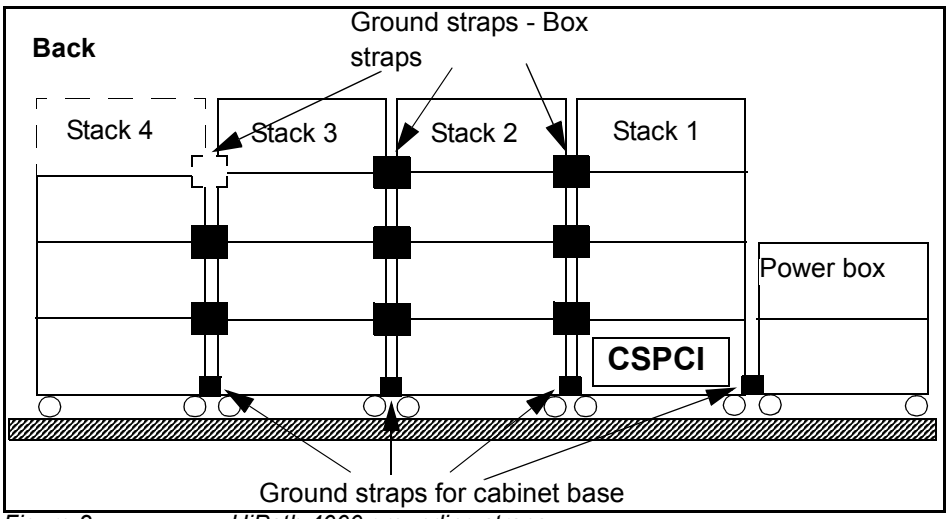


*Figure 2 HiPath 4000 grounding straps*

***IMPORTANT:*** For the CSPCI box, no extra FPE line (green/yellow) is needed. Grounding occurs via the 230 Vac or the 0 Vdc.

### 6.2.1 Grounding the Base Cabinets

To ground the base cabinets:

1. Position the individual stacks and the power box according to the site to avoid repositioning them later.
2. Using the supplied ground straps (1), determine the correct distance between the roller bases by inserting the straps in adjacent bases (see Figure 3).
3. Attach the various ground straps to the left (2) and right (3) of the roller base using the screws that are provided.


*Figure 3 Installing the ground strap at the base of the cabinets*

## 6.2.2 Installing the Ground Straps Between Cabinets

**WARNING**

**Risk of electric shock as a result of an incorrect grounding conductor connection**
Never operate the system without the specified straps. The strapping serves as an internal grounding conductor connection for the individual components.

To install the ground straps between cabinets:

1. Removing the four screws shown in (1) of Figure 4.
2. Insert the supplied ground straps (2) and tighten the screws.
3. Depending on the system configuration, attach additional ground straps between the two stacks and the power (3) and (4).

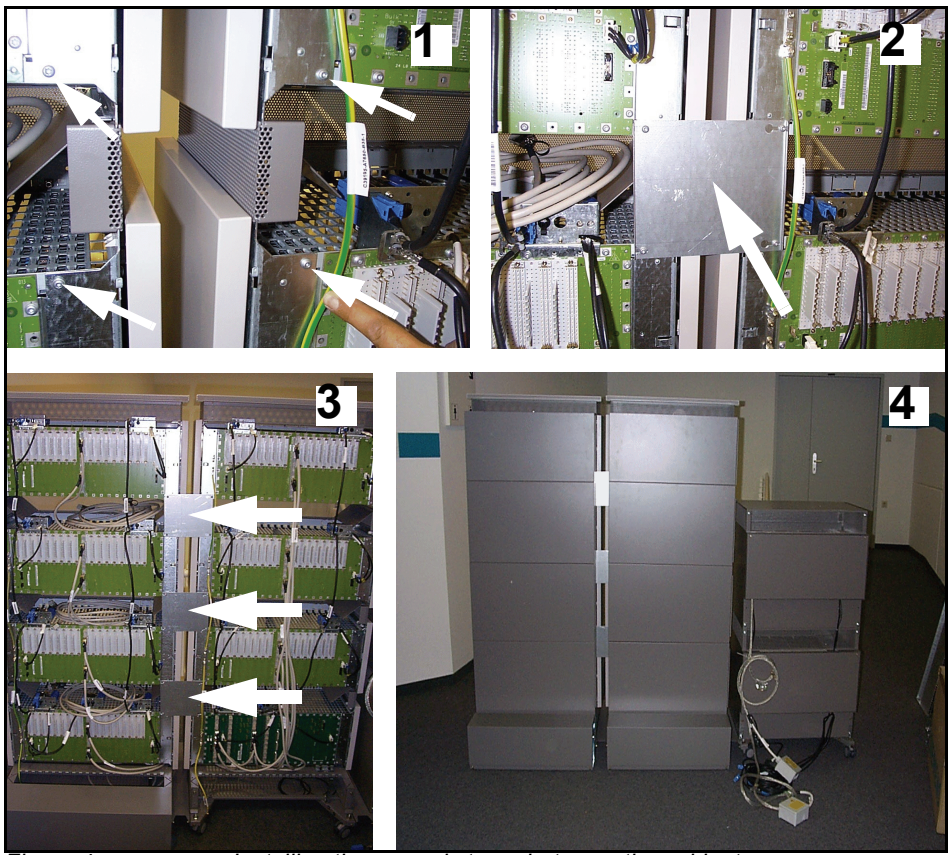


*Figure 4 Installing the ground straps between the cabinets*

## 6.3 Grounding the System, I.M.

To ground the system, connect a second ground conductor to the terminal connection (1) of the main distribution frame (see Figure 1) and connect this to the ground connection in the roller base (see Figure 5).

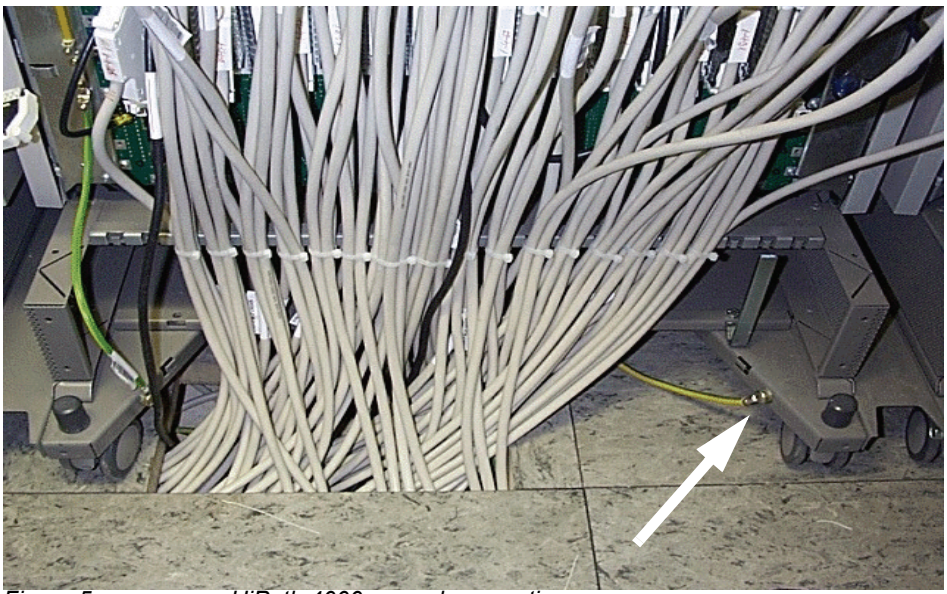

*Figure 5 HiPath 4000 ground connection*

An internal ground conductor between the base cabinet and the expansion cabinets is supplied ex-works. See Figure 7.

## 6.4 Grounding the System, U.S.

To ground the system in the U.S.:

1. Attach one end of the ground wire to the back of the cabinet as shown in Figure 6.

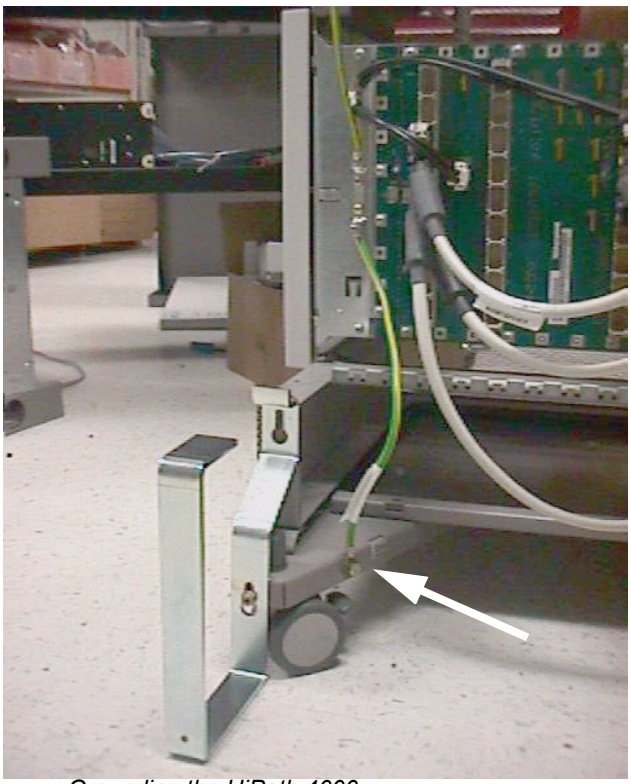

*Figure 6 Grounding the HiPath 4000*

2. Attach the other end of the ground wire to the back of the common control shelf.
3. Attach the remaining grounding wires to the expansion cabinets (see Figure 7).
4. Secure the wires with screws.

---

***IMPORTANT:*** Further information about power supply and grounding for HiPath 4000 systems operated in the U.S. can be found in the following manual: *HiPath 4000 V5 Customer Site Planning and Power Grounding Manual*.

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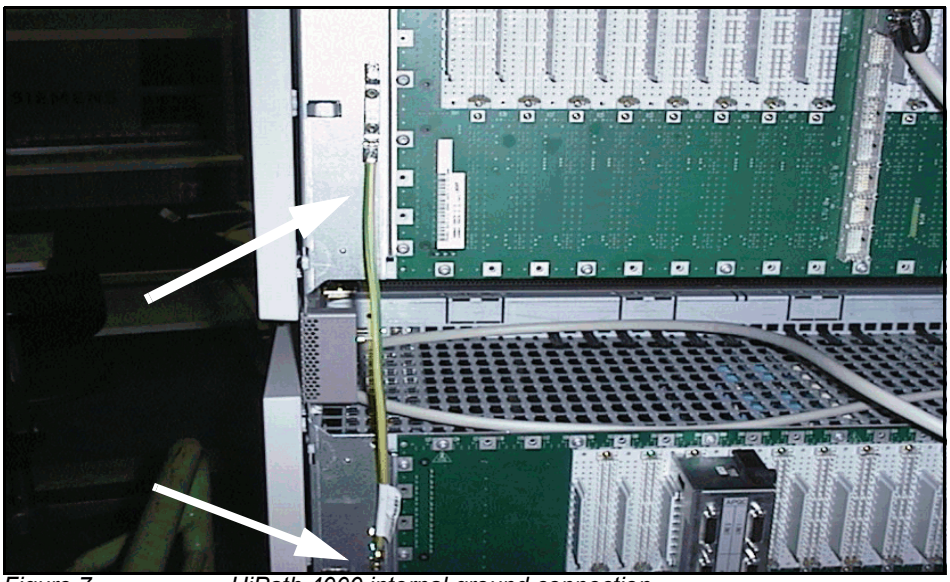

*Figure 7 HiPath 4000 internal ground connection*

## 6.5 Grounding AP 3700 System Cabinets

To ground the AP 3700 cabinets, see the following alternatives, which depend on the installation (standalone unit or expansion cabinet; see Figure 8 for grounding connectors):

- Connect the ground conductor directly from the ground busbar to the grounding connector.

Or:

- Extend an existing internal ground conductor from a HiPath 4000 system and attach it to the grounding connector on the AP 3700.

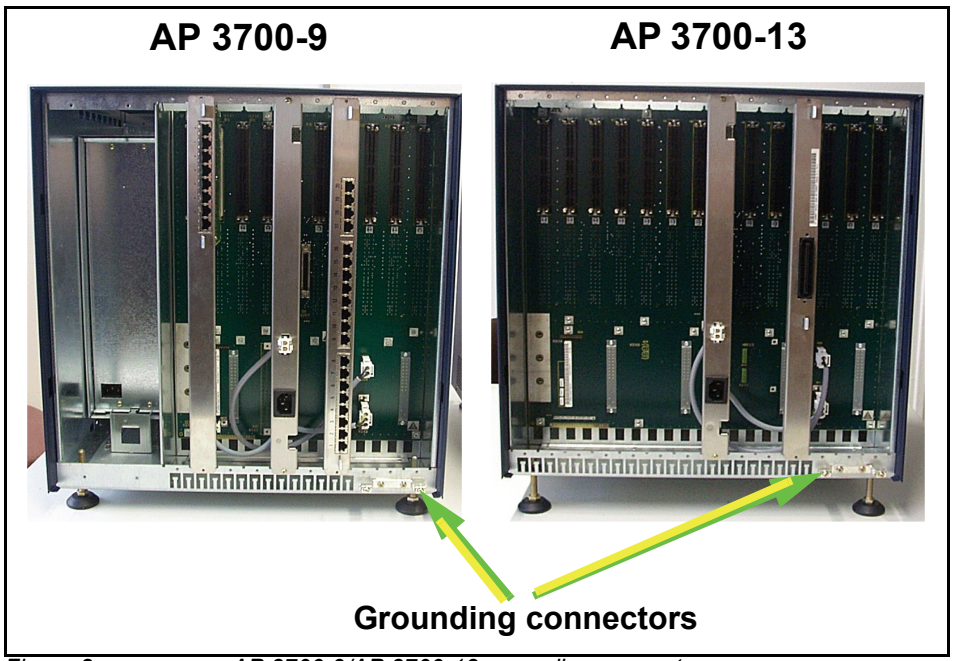


*Figure 8 AP 3700-9/AP 3700-13 grounding connectors*

## 6.6 System Ground Connections

Network type TN-S (neutral conductor 0V, protective ground connector PE; functional and protective ground FPE).

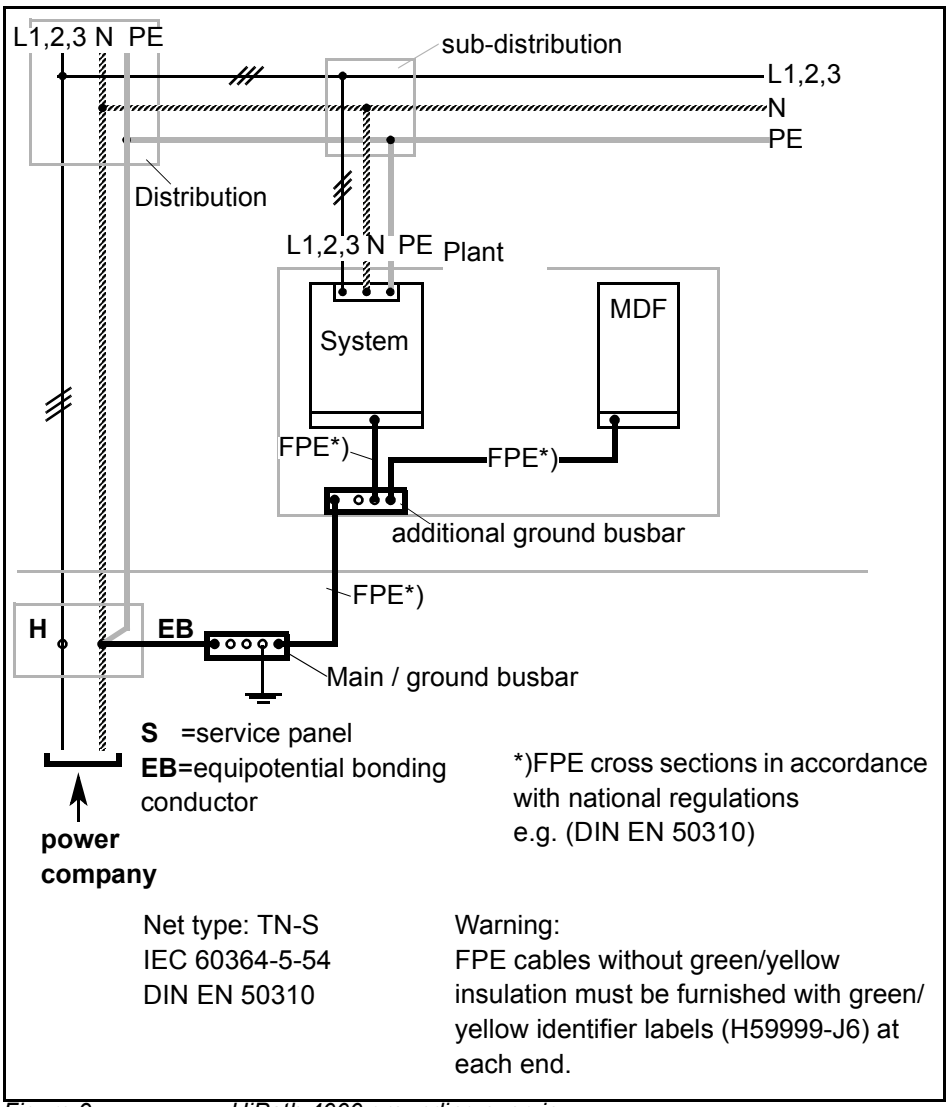


*Figure 9 HiPath 4000 grounding overview*

Figure 10 and Figure 11 provide a schematic overview of the system ground connections. These diagrams apply to U.S. with the exception of the connection to the MDF.

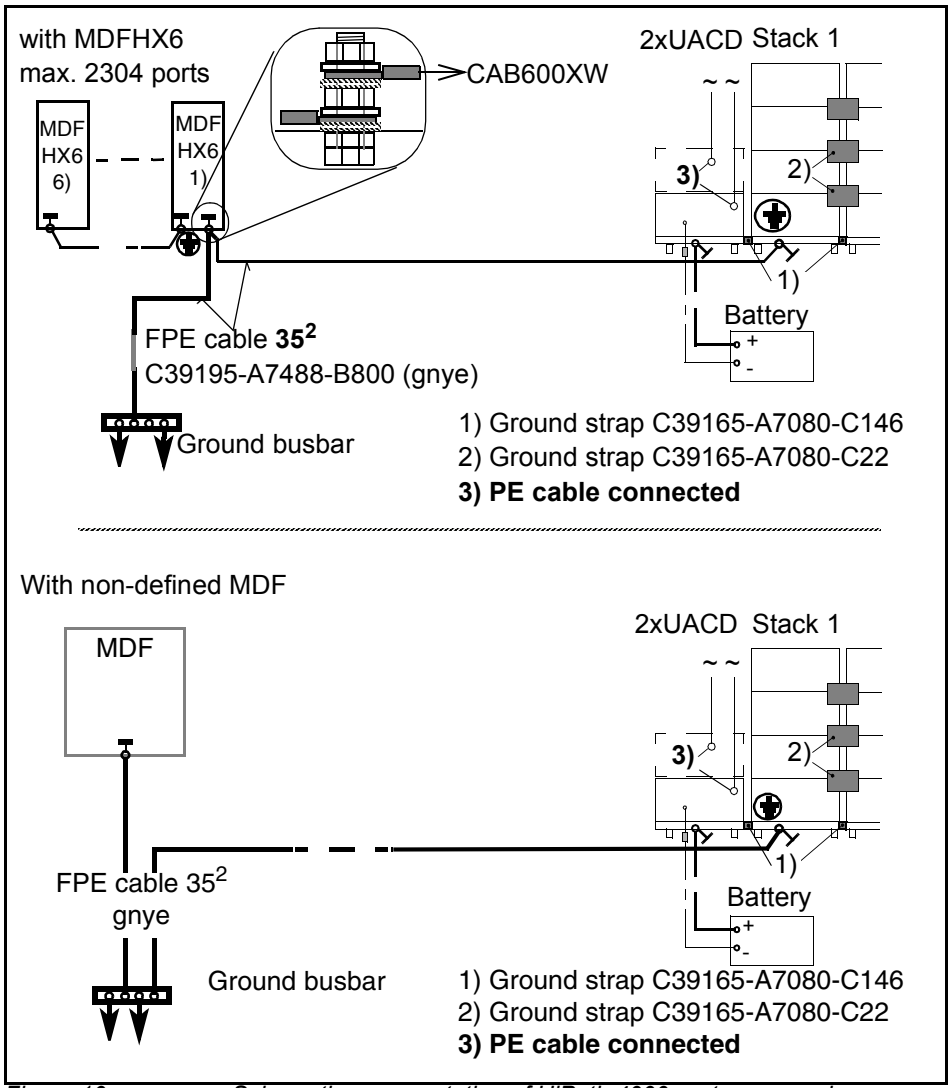


*Figure 10* *Schematic representation of HiPath 4000 system ground connections*

Figure 11 provides an illustration of the system ground connections for HiPath 4000 in the 19-inch configuration.

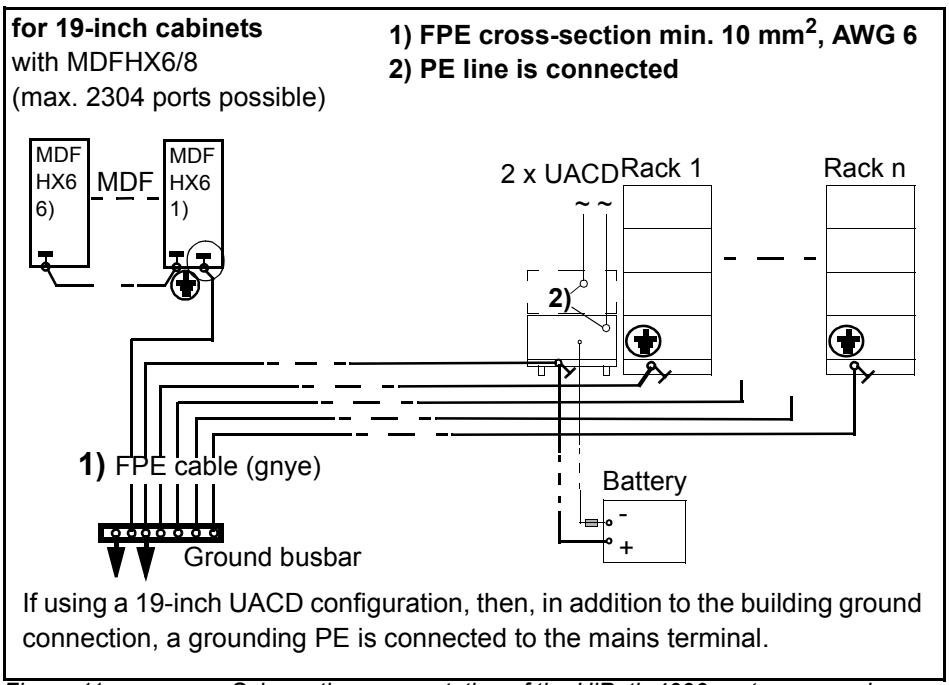


*Figure 11* *Schematic representation of the HiPath 4000 system ground connections (19-inch cabinets)*

Figure 12 shows how the ground connector is connected to the 0-V busbar on the 19-inch cabinet

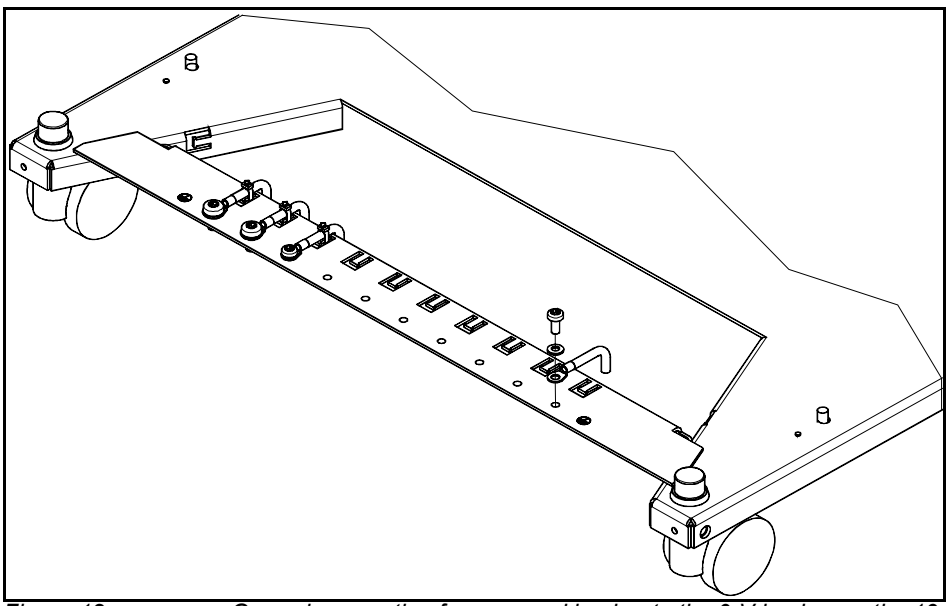

*Figure 12* *Ground connection from ground busbar to the 0-V busbar on the 19-inch cabinet*

# 7 Connecting to the Mains and Power Supply

This chapter describes the various mains connection and power supply variants.

## 7.1 Connecting to the Mains

***IMPORTANT:*** Mains is a term used in Europe to describe a normal commercial outlet. Mains is going to be used throughout this document to describe the AC outlet.

***IMPORTANT:*** The HiPath 4000 must be connected to a TN-S network for installation purposes. An independent electric circuit must be used to protect both cabinets in the event of mains failure.

TN-S is a type of grounding classification. Each letter indicates as follows:
- T—All exposed conductive metalwork connected directly to ground.
- N—All exposed conductive metalwork connected directly to the grounded supply conductor
- S—Separate and neutral ground conductors.

**WARNING**

**Electric shock due to disconnected ground wire!**
The grounding wire of the in-house power connector must always be connected to the mains power socket first.

HiPath 4000 has been designed to accept four different types of power supply worldwide as follows:

***NOTE:*** The HiPath 2k/3k/4k PSU is sufficiently protected against lightning (up to 2kV) on the 230V connection. For areas at particular risk, it is recommended that additional lightning protection be provided before the connection line. The lightning ground bar with the part number **C39334-Z7052-C32** offers increased protection up to 4kV.
**The use of a lightning ground bar is mandatory in Brazil.**

- Three-phase mains (~230 V/400 V)
- Single-phase mains for max. 2 power supply units
- Single-phase mains with midpoint grounding (~110 V/220 V) or (~120 V/240 V)
- Three-phase mains (~120 V/208 V) or (~127 V/220 V)

**There are two connection variants to the mains:**

- Connecting to the mains directly by means of a power supply unit (nonredundant power supply) in the individual shelves (LUNA/LPC80).
  To connect the HiPath 4000, modem and TAP (technician workstation) to the mains, a multiple-plug connector must be supplied by the **customer**. This multiple-plug connector must be installed so that the system power cable supplied is sufficient (length = 3 m [10 ft]).

**WARNING**

**Safety cannot be guaranteed if the mains plugs are inaccessible.**
The mains plug must be easily and safely accessible in all installation variants. Unplug the mains plug immediately in the event of danger!

- Connecting to the mains by means of a power box (redundant power supply)

**WARNING**

**Electric shock due to disconnected ground wire!**
Before starting up the system and connecting the stations, connect the system correctly to the ground wire.
Never operate the system without the required ground wire.

***IMPORTANT:*** You can choose which variant is applicable to your installation.

## 7.1.1 Connecting to the Mains with LUNA/LPC80 Power Supply Units

In the nonredundant power supply variant, the mains connection is made directly to the various power supply units by means of a connector strip (the connector strips are located in the base of each stack). Depending on the local power supply (in-house connection), you must observe the connection criteria in Figure 1.

***IMPORTANT:*** In Canada and U.S., only L1, L2, and PE are brought to the wall socket. The neutral lead for 208 Vac power is not brought to the wall socket.

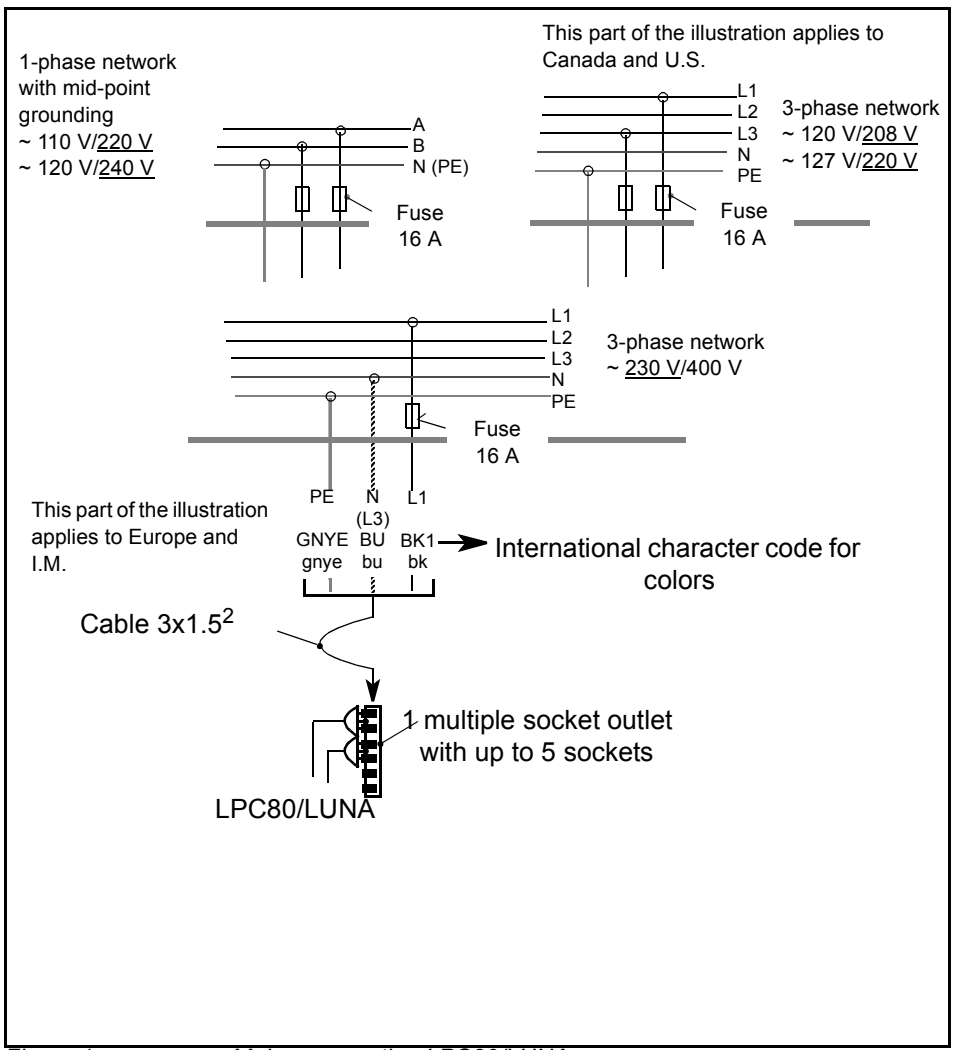


*Figure 1 Mains connection LPC80/LUNA*

The power cables should already be installed in new systems. Should the AC-to-DC shelf power supply cables become unplugged during transit, route the power cable in a HiPath 4000 as follows:

1. Ensure that the system is off.
2. Plug the power cable into the AC-to-DC shelf power shelf supplies ( LPC80).
3. Route the power cable through the metal knock-out (see Figure 2) and to the back of the system.
4. Secure the power cable with a tie-wrap on the metal knock-out.

---

***NOTE:*** Two cable ties are required for proper EMI grounding.

---

5. Route and plug the other end of the power cable to the mains socket (AC outlet) in the base unit (BAU) under the shelf (see Figure 3).
6. Repeat this procedure to the L80XF (expansion) cabinets if you have a multi-cabinet installation.

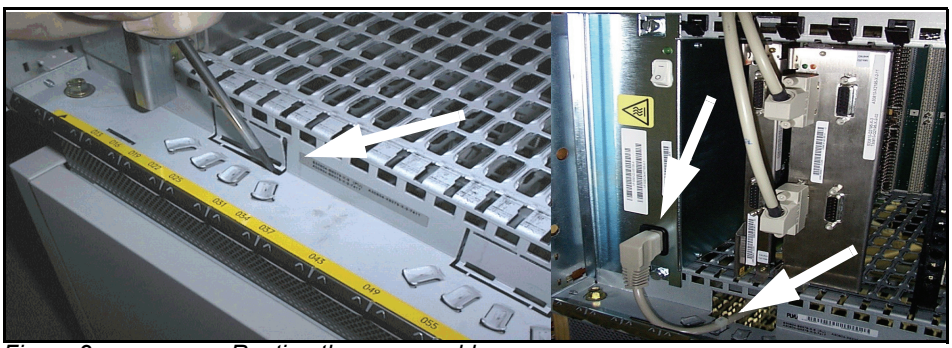

*Figure 2 Routing the power cable*

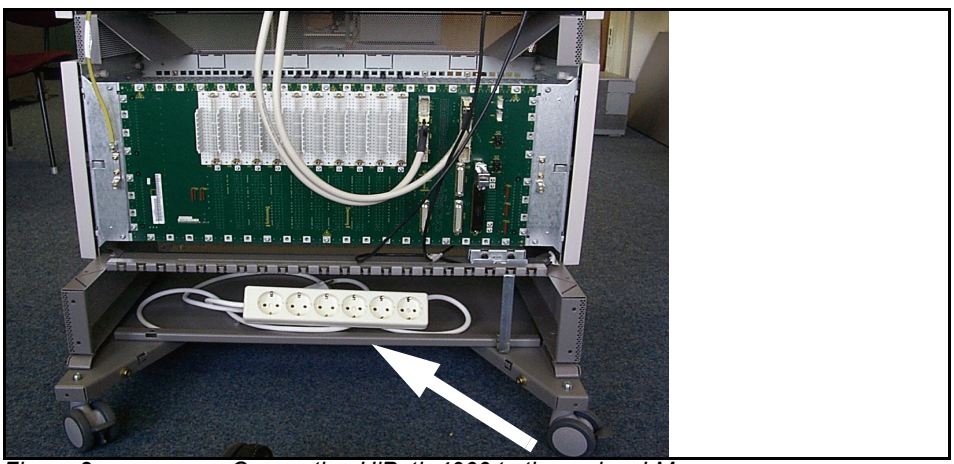

*Figure 3 Connecting HiPath 4000 to the mains, I.M.*

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***IMPORTANT:*** Figure 3 shows an illustration for the I.M. Canada and U.S. use a different outlet strip.

---

## 7.1.2 Connecting to the Mains Using the Power Box

***IMPORTANT:*** In North America, connection is made to the mains using a power cable with a plug. This power cable is connected to the mains socket at the factory. The mains socket is mounted in the UACD and the strain-relieved connection cable is fed out of the power box.

In the case of the redundant power supply variant, the connection is made to the mains using a power connector socket on the power box. Depending on the local power supply, you may need to make a distinction between the different connection variants.

To connect to the mains by means of the power box:

1. Remove the shielded power line with connection box from the power box (Powershelf 1 or Powershelf 2) and remove the cover of the mains socket.
2. Plug the power cord to the mains socket.

***IMPORTANT:*** The shielded power lines of the powershelves no longer need to be attached to the frame using a grounding bracket.

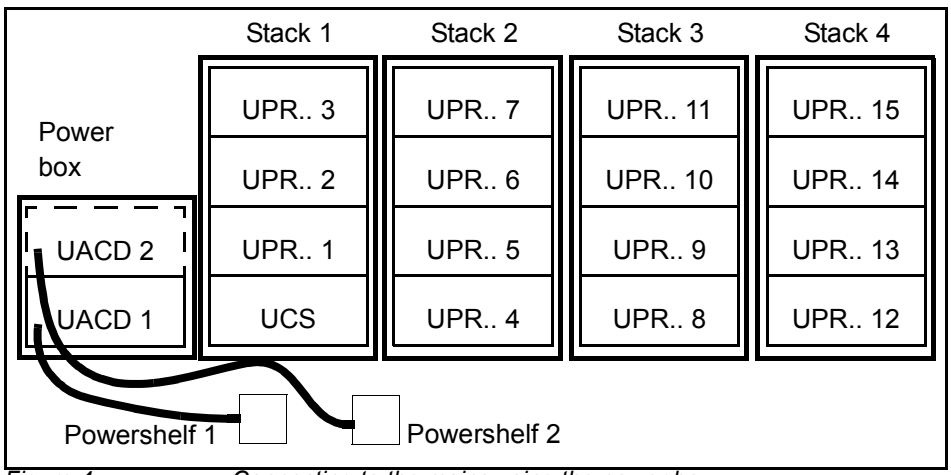



*Figure 4 Connecting to the mains using the power box*

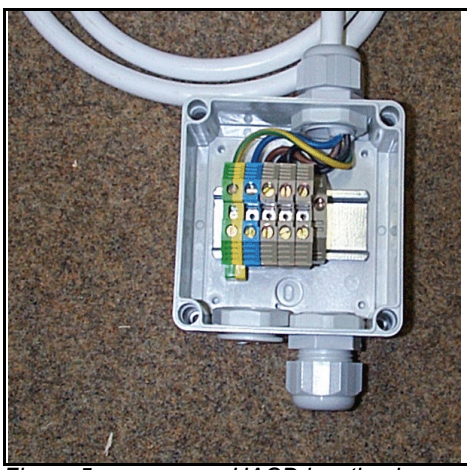
## 7.2 Installing a Three-Phase Network

**WARNING**

**Electric shock due to disconnected ground wire!**
Before you connect the three-phase power cable (~230 V/400 V), ensure that the protective ground terminal (building ground) is connected to the system frame.

To install a three-phase connection:

1. Remove the cover to the junction box.
2. Unscrew the coupling on the junction box.
3. Insert the open end of the power cable through the junction box.
4. Strip the wires on the power cable, insert, and secure the wires to the terminals as follows: (see Figure 5 and Figure 6):
   a) Attach the green/yellow wire to the (GNYE) terminal.
   b) Attach the blue wire to the (BU) terminal.
   c) Attach the brown wire to the (BN) terminal.
   d) Attach each of the two black wires that emerge from the mains cable to a separate (BK) terminal on the distribution socket.
   e) Depending on the system configuration, repeat the same procedure sequence for the second power socket.
5. Tighten the screw on the junction box and replace the cover.



The colored wires are as follows.

Green/yellow = grounding wire PE (GNYE)
Blue = neutral N (BU)
Brown = phase 1 L1 (BN)
Black = phase 2 L2 (BK)
Black = phase 3 L3 (BK)

*Figure 5 UACD junction box*

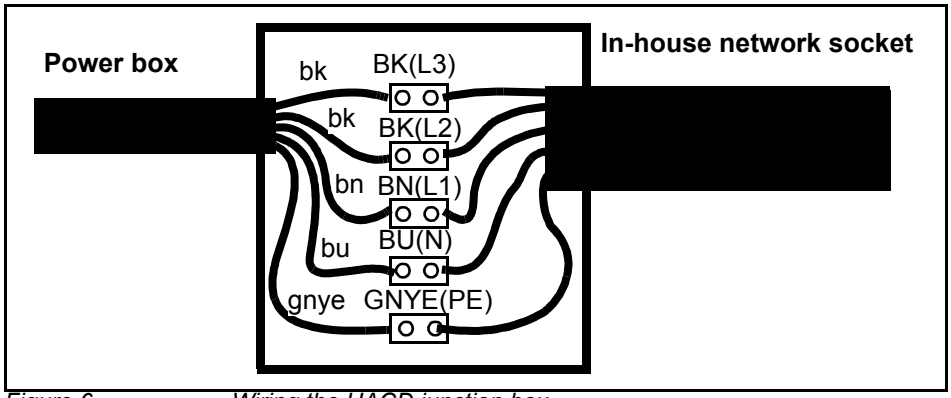



*Figure 6 Wiring the UACD junction box*

## 7.3 Installing a Single-Phase Network

With this type of connection, you need to make a few wiring changes in the junction box and UACD power supply frame before you can make the connection to the in-house network.

**WARNING**

**Electric shock due to disconnected ground wire!**
Before you connect the single-phase power, ensure that the protective ground terminal (building ground) is connected to the system frame.

To install a single-phase connection to a maximum UACD configuration:

1. Remove the cover to the junction box.
2. Unscrew the coupling on the junction box.
3. Insert the open end of the power cable through the junction box.
4. Strip the wires on the power cable, insert, and secure the wires to the terminals as follows:
   a) In the junction box, bridge the BN(L1) port with BK1(L2).
   b) Connect the power switches 1, 2 and 3 to the ACDPX in the power supply frame of the UACD, as shown in the Figure 7.
5. Replace the cover of the junction box.
6. Route the power cable to the mains.

## 7.4 Overview of Mains Connection 1

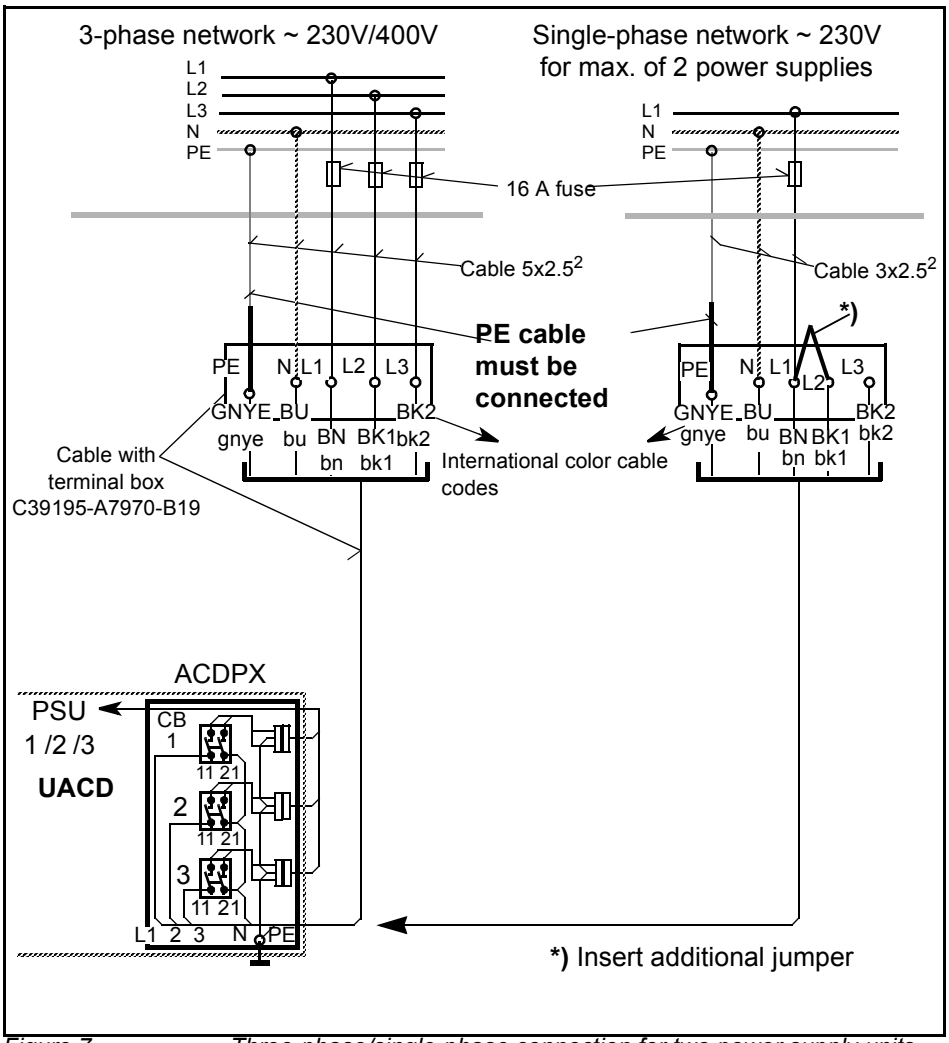



*Figure 7 Three-phase/single-phase connection for two power supply units*

## 7.5 Installing a Three-Phase or Single-Phase Connection with Mid-Point Grounding, I.M.

With this type of connection, you need to make a few wiring changes in the junction box and also in the power supply frame before you can make the connection to the in-house network.

**WARNING**

**Electric shock due to disconnected ground wire!**
Before you connect the power phases, make sure that the protective ground terminal (building ground) is connected to the system frame.

To install a three-phase or single-phase connection with mid-point grounding:

1. Remove the cover to the junction box.
2. Unscrew the coupling on the junction box.
3. Insert the open end of the power cable through the junction box.
4. Strip the wires on the power cable, insert, and secure the wires to the terminals as follows:
   a) Insert and secure the blue (BU) and brown (BN) wires together in the junction box.
   b) Insert and secure both black (BK) lines together.
   c) Connect the power switches 1, 2 and 3 to the ACDPX in the power supply frame UACD, as shown in the Figure 8.
5. Replace the cover of the junction box.
6. Route the power cable to the mains.

**WARNING**

**Electric shock due to the connection of unapproved systems!**
Only one HiPath 4000 DC system with a 25A fuse may be connected per stack to the UACD.

# 7.6 Overview of Mains Connection 2, I.M.

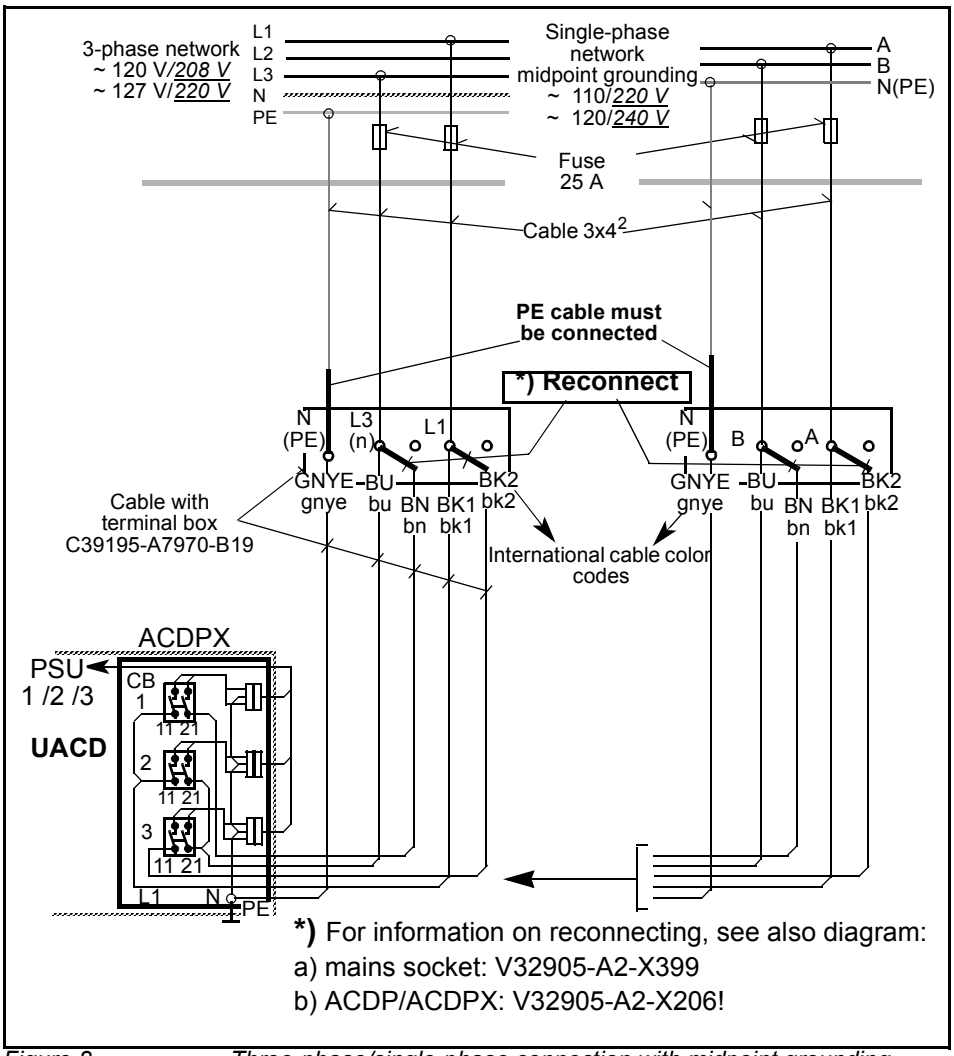



*Figure 8 Three-phase/single-phase connection with midpoint grounding*

## 7.7 Power Supply

In HiPath 4000, each cabinet is supplied with integrated AC/DC power supplies (LPC80). An external power box is connected to the HiPath 4000 to support power distribution to the cabinets.

***IMPORTANT:*** A power box connection is supported for battery management in HiPath 4000 and later. For North America (NA) this connection is not supported.

***NOTE:*** The contact area of all power supply cables must be bonded with two cable fasteners each (see Figure 52 on page 162).

The DC power supply usually has a voltage of –48 V. However, some modules require –60 V. A power supply module (APPS) is used in this case. This -60-V power supply is only provided for individual shelves.

***NOTE:*** Never plug in or unplug the APPS module when the power is on.

## 7.8 AC Connection to Power Supplies

In systems with nonredundant power supply, the CSPCI shelf contains an ACPCI power supply unit (2 ACPCIs in duplex mode) and each expansion cabinet (L80XF) contains an LPC80 power supply unit. Each of these power supply units is separately fed with ~230V. This power supply unit has an input voltage range of ~176 V to ~253 V (45 Hz - 66 Hz) without supplementary settings. A –48V output voltage is generated and this in turn is transformed into several lower voltages by a second power supply unit. (PSUP).

### 7.8.1 Routing the Power Cables on an AC-Powered, Nonredundant HiPath 4000

To route the power cables in an ac-powered, nonredundant HiPath 4000 (see also Figure 11 and Figure 12):

1. Ensure that the system is off.
2. If your system features redundant CPUs: Connect the power cables to the AC/AC power management unit (LPC80).
3. Route the power cables (1) downwards through the frame's metal knock-out (2) (see Figure 9) to the base unit assembly (BUA) under the CSPCI shelf.

4. Secure the power cables with tie-wraps on the metal knock-outs (3).
5. Plug the other end of the power cables to the ac outlet in the BUA.
6. Follow steps 2 through 9 on page 7-126 in Chapter 7, "Routing the Power Cables on an AC-Powered, Redundant HiPath 4000".

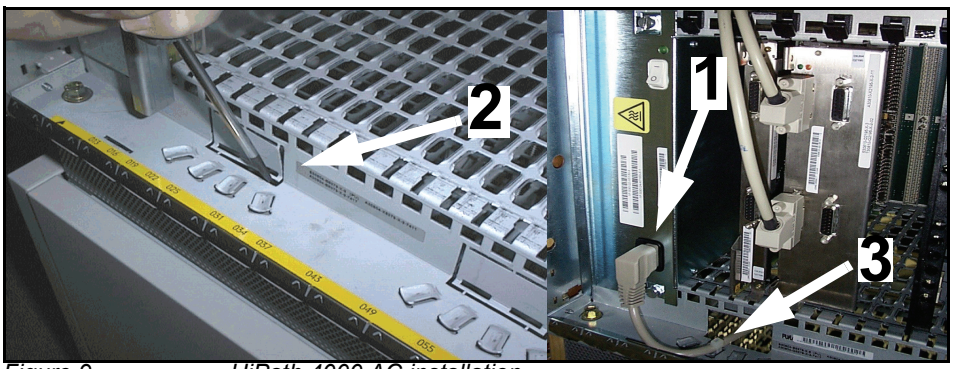



*Figure 9 HiPath 4000 AC installation*

## 7.8.2 Attaching the Power Cable to the CSPCI Box

If the power cable has not already been attached at the factory, proceed as follows:

1. Remove the fixing screws (1) from the MCM board on the back of the CSPCI box and remove the board (see also Figure 10).
2. Insert the power cable in the socket (2) on the CSPCI box and secure it to the cord grip (3) with a cable tie.
3. Route the power cable through the cable duct (4) on the MCM board and screw the MCM board back onto the CSPCI shelf.

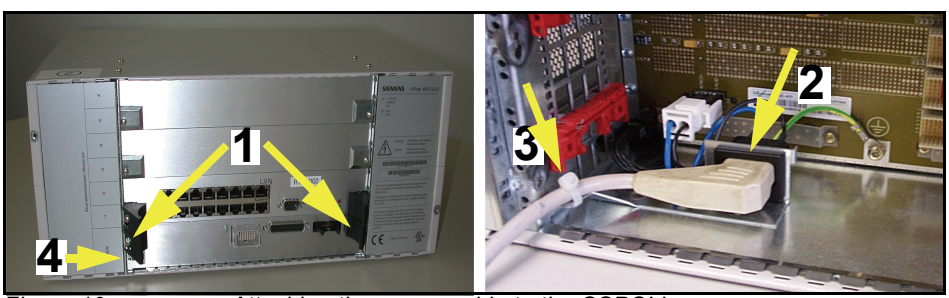
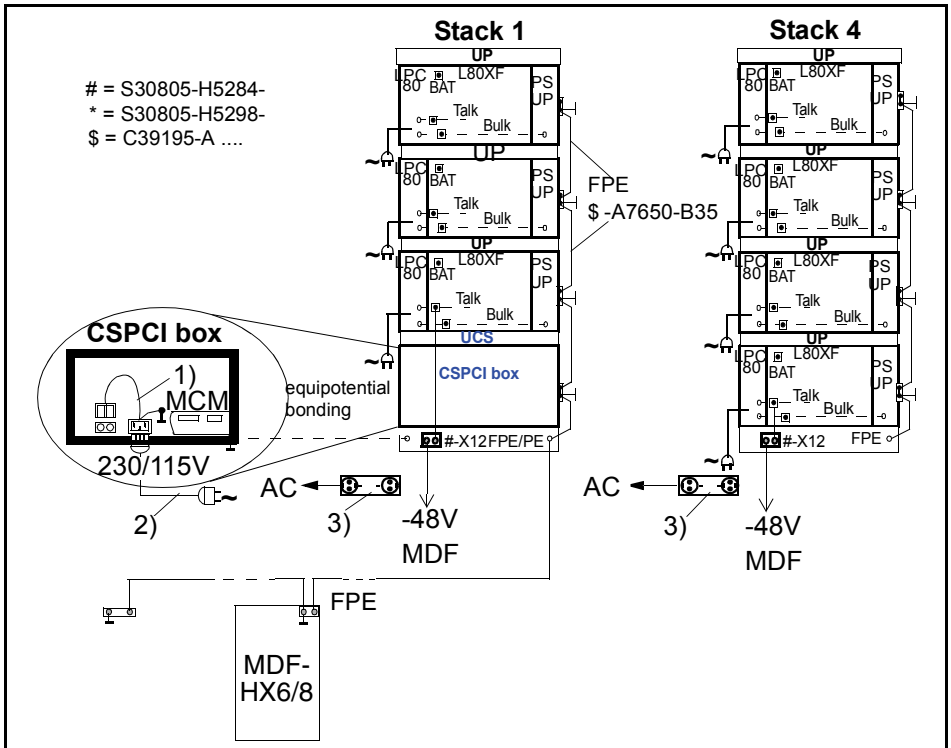


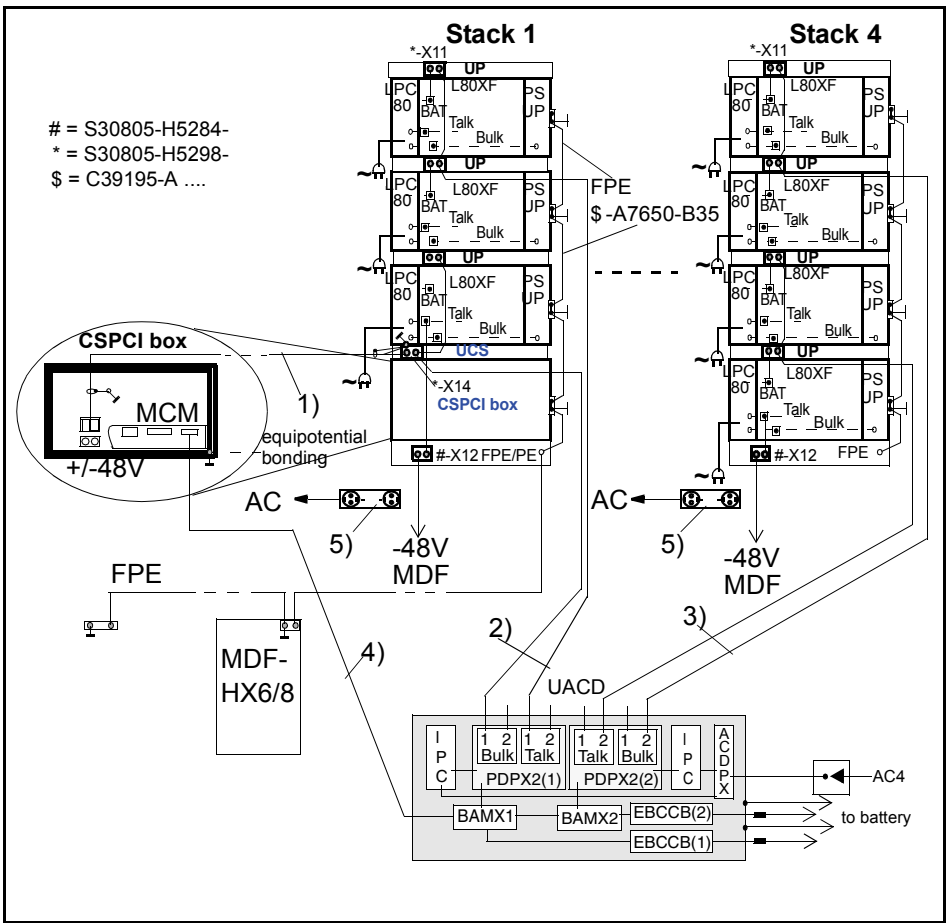

*Figure 10 Attaching the power cable to the CSPCI box*

Figure 11 shows a diagram of the AC connection with an L80XF cabinet.




| No. No. | Part number code no. | Bez. / design | Bemerkung / remark von / from --> nach / to |
|---|---|---|---|
| 1) | C39195-A7985-B1 | AC connection | CSPCI, MCM, AC --> MCM, Mate-N-Lok, DC |
| 2) | C39195-Z7001-C17<br>C39195-Z7000-C92 | power cable for "IM"<br>" for "NA" | CSPCI, MCM, AC --> power or UPS |
| 3) | C39334-Z7052-C22<br>S30807-H6586-X | power strip for "IM"<br>NAPSK for "NA" | Stack 1...4 |

*Figure 11 AC connection with UP/L80XF cabinet (nonredundant)*




| No.<br>No. | Part number<br>code no. | Bez. / design | Bemerkung / remark<br>von / from --> nach / to |
|---|---|---|---|
| 1) | S30805-H5298-X14 | DC connection | Stack 1, UCS |
| | C39195-A7944-B38 | DC cable | Stack 1, UCS --> CSPCI box, MCM, Mate-N-Lok |
| 2) | C39195-A7944-B16 | Cable | UACD, DC connection --> Stack 1-2 |
| 3) | C39195-A7944-B17 | Cable | UACD, DC connection --> Stack 3-4 |
| 4) | C39195-Z7904-A25 | ALIN | CSPCI box, MCM, ALIN --> UACD, BAMX1 |
| 5) | C39334-Z7052-C22<br>S30807-H6586-X | power strip for "IM"<br>NAPSK for "NA" | Stack 1...4 |

*Figure 12 AC connection with UP/L80XF cabinet + battery backup (nonredundant)*

## 7.9 Setting the Operating Mode for the LPC80, I.M.

Two power supply units (PSU) from two different manufacturers can be used for LPC80. A switch located at the back of the PSU allows you to set the operating mode of the PSU to *Power Supply* or *Battery Charger*, depending on the particular application. The operating modes are:

ON = Battery charger

OFF = Power Supply

---

***IMPORTANT:*** The battery charger feature is not used in Canada or U.S.

---

Figure 13 shows the switch of the two different power supply units. Set the operating mode of the power supply unit using this switch.

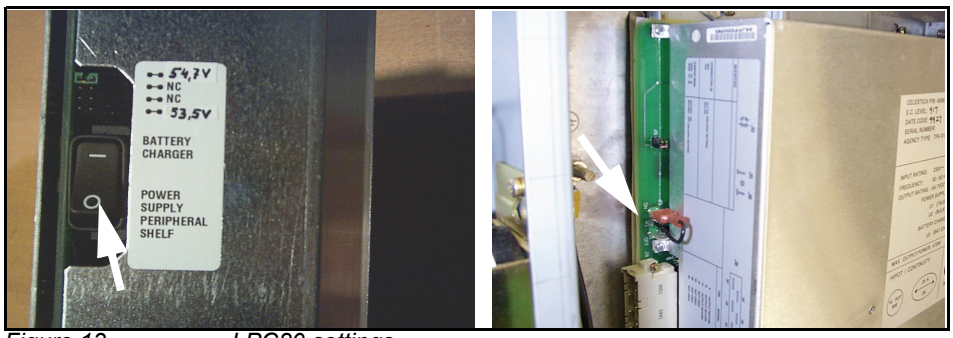



*Figure 13 LPC80 settings*

## 7.9.1 Setting the Operating Mode

Table 1 lists the operating modes of the LPC80.

| | | |
|---|---|---|
| Between standard/ charger mode (on the back of the LPC80) | for -K7162- | Artesyn: neutral switch, clearly identifiable from sticker<br>1st option: Battery Charger<br>2nd option: Power Supply Peripheral Shelf: standard mode forebodes |
| | for -K7163- | Celestica: jumper W1, clearly identifiable from sticker<br>ON --> connector W1 with J5 --> battery charger mode<br>OFF --> connector W1 with<br>J6 --> standard mode for CAB80DSC |
| | for K7554- | Supplier: MagneTek 3-pin connector behind a window on the underside of the power supply unit. (2 screws)<br>1. Connector in "Mode1": as used with peripheral shelves<br>2. Connector in "Mode2": as used with battery chargers |
| Between two possible voltages (in charger mode) | for -K7162- | Artesyn: jumper setting, clearly identifiable from sticker<br>1st option: 54.7 V (factory setting)<br>2nd option: 53.5 V |
| | for -K7163- | Celestica: jumper J9, clearly identifiable from sticker<br>1st option: connection between pin 3 and pin 4 from J9 --> 54.7V (factory setting)<br>2nd option: connection between pin 3 and pin 4 from J9 --> 53.5V |
| | for K7554- | Supplier: MagneTek Switch on the underside of the power supply unit; (voltages shown on circuit board)<br>- Switch in left position --> 53.5V<br>- Switch in right position --> 54.7V |

*Table 1 Operating mode settings of the LPC80*

## 7.10 DC Connection with the External Power Supply, I.M.

***IMPORTANT:*** In Canada and U.S., the UPS provides AC power only. It is not a source of DC power.

An external system power supply (uninterruptible power supply [UPS] in the U.S.) is a PSU in which a jumper is connected to the system instead of the LPC80 power supply unit (see Figure 18). The jumper feeds the –48 V external power supply to the system. The external –48V is connected from the DC power box to the individual backplanes of the system cabinets.

The connection of an external battery is identical to the connection of an external power supply unit.

### 7.10.1 Routing the Power Cables on an AC-Powered, Redundant HiPath 4000

The bulk and talk circuit breaker cables connect to the UACD or UDCD at one end. At the HiPath 4000, you need to connect the bulk and talk circuit breaker cables as follows (see Figure 20):

1. Ensure that the system is off.
2. At the back of the CSPCI frame:
   Connect the BULK circuit breaker cable to the DC connector on the CSPCI box (see Figure 15) and then create a daisy-chain connection to the X12 connectors on the expansion cabinets.

   ***NOTE:*** Ensure that the cables are locked down, otherwise, the LTU shelf that is connected to is not going to function properly.

   ***IMPORTANT:*** The top blue connector bulk cable on top of the CSPCI box connects to the bottom blue connector of the LTUW cabinet. The top blue connector bulk cable on the LTUW cabinet connects to the bottom blue connector of the LTUW cabinet immediately above it and so on.

3. At every cabinet:
   Connect and tie-wrap the shielded portion of the –48 Vdc bulk input power cables to the cabinet frame.
4. At every cabinet:
   Connect the -48-Vdc bulk input power cable to the shielded ground at the left side of each cabinet.

5. For systems with redundant power supply:
   Route the other two –48 Vdc bulk cables over to the left side of the CSPCI frame and tie-wrap the shielded portion of the cable to the shielded ground.
6. Connect the -48-Vdc input talk circuit breaker cables to the X11 connector of the LTUW shelf.
7. Daisy-chain the -48-Vdc input talk circuit breaker cables to the upper LTUW shelves.
8. At every cabinet:
   Connect the -48-Vdc talk input power cable to the shielded ground at the left side of each cabinet.
9. At the back of the CSPCI frame:
   Route the bottom blue connector -48-Vdc bulk cable (input) to the -48-Vdc connector at the back of the output distribution panel of the UACD or UDCD.
   In the UACD, this cable is called the ALUM cable, and it plugs to the TBD connector.
   In the UDCD, this cable is called the power fail cable, and it plugs to the DCPFX1-E3 connector.

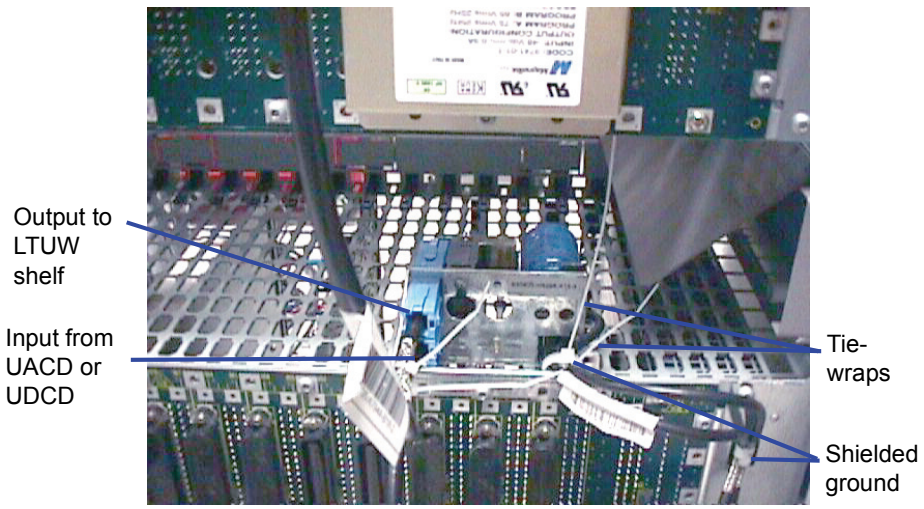



*Figure 14 Connecting the bulk power*

## 7.10.2 Routing the Power Cables from the UACD and UDCD to the HiPath 4000

***NOTE:*** Ensure that the power is off.

All internal cabling for the UACD and UDCD should be complete when the equipment goes out of the factory. The output power cables on the UACD and UDCD are also already connected on the power shelves.

In the UACD or UDCD, the output power cable must be connected to the CSPCI connector (bottom blue connector of the bulk circuit breaker, see Figure 14).

## 7.10.3 Attaching a DC Cable to the CSPCI Box

If the DC cable has not already been attached at the factory, proceed as follows:

1. Connect the -48V cable from the external battery to the DC terminal (1) on the base cabinet (see Figure 15).
2. Route the -48V from the -48V fuse module to the CSPCI backplane (2).

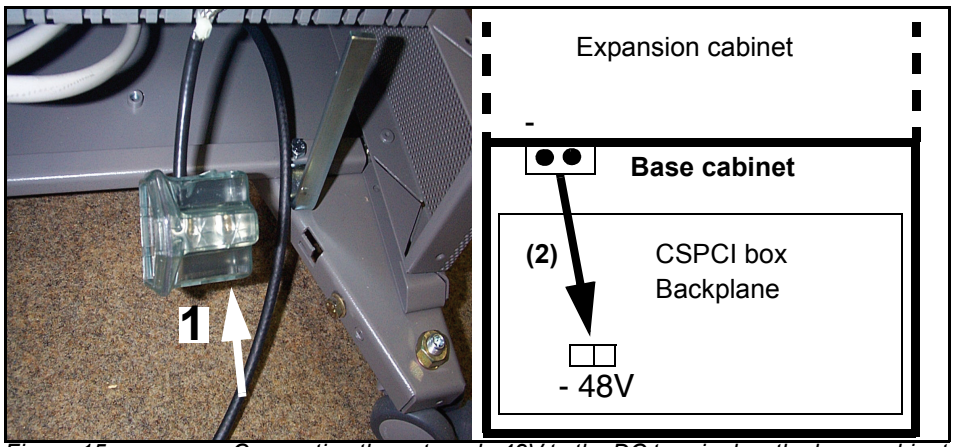



*Figure 15 Connecting the external –48V to the DC terminal on the base cabinet*

3. Remove the fixing screws (3) from the MCM board on the back of the CSPCI box and remove the board (see also Figure 17).

***IMPORTANT:*** The factory setting for the CSPCI shelf's power supply coding is always set to ACPCI. To use DC power supplies (DCPCI), you must change the coding as indicated in Figure 16.

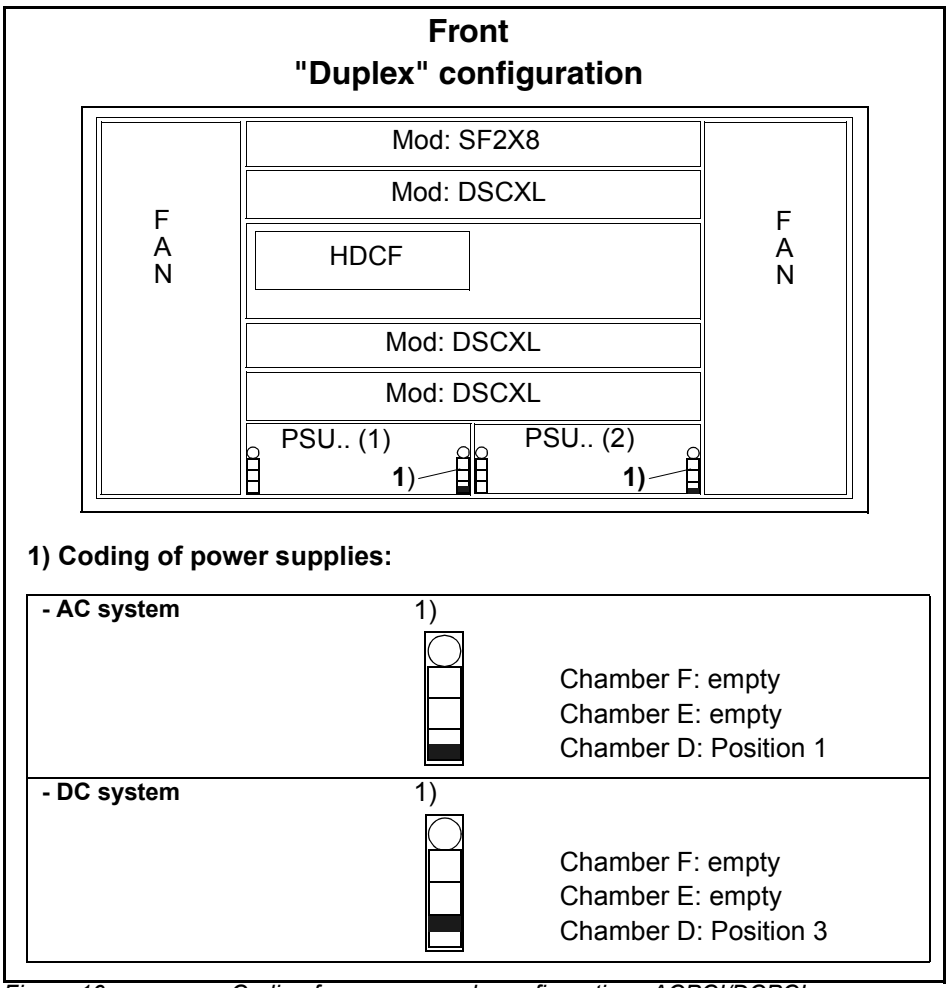



*Figure 16 Coding for power supply configurations ACPCI/DCPCI*

4. Insert the DC cable in the socket (4) on the CSPCI box and secure the cable shield to the cord grip (5) with a cable tie.

5. Route the DC cable out through the cable duct (6) on the MCM board and screw the MCM board back onto the CSPCI shelf.

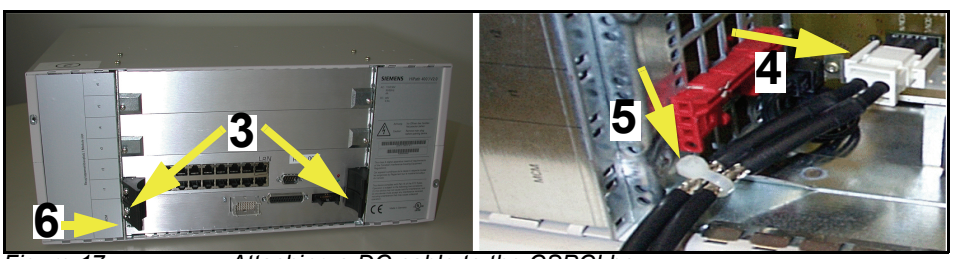



*Figure 17 Attaching a DC cable to the CSPCI box*

6. Once the -48V cable is connected, check that the correct jumper is plugged into the designated plug connector for the LPC80 (see Figure 18).

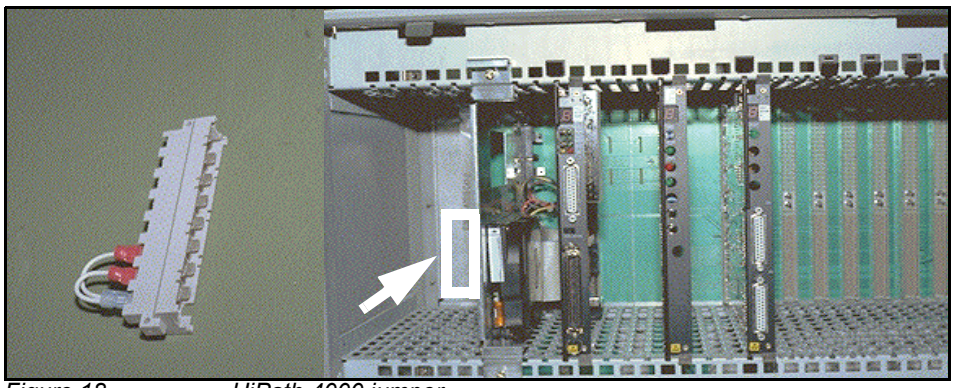
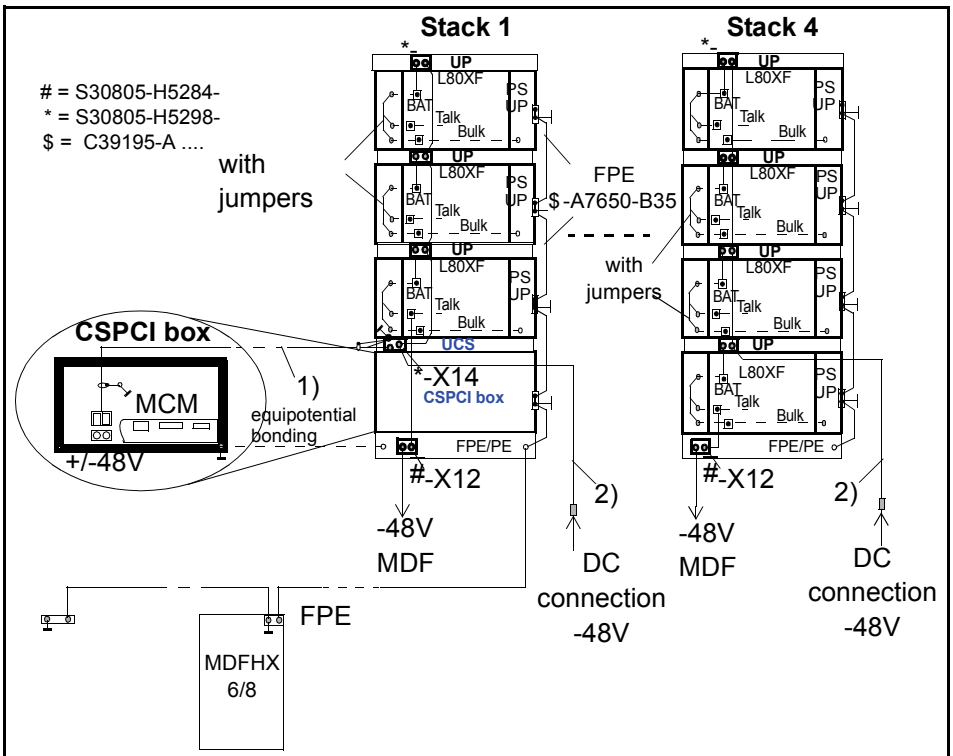


*Figure 18 HiPath 4000 jumper*

## 7.11 DC Connection with UP/L80XF Cabinet, I.M.




| No. No. | Part number code no. | Bez. / design | Bemerkung / remark von / from --> nach / to |
|---|---|---|---|
| 1) | S30805-H5298-X<br>C39195-A7944-B38 | DC connection<br>DC cable | Stack 1, UCS<br>UCS --> CSPCI box, MCM, Mate-N-Lok |
| 2) | C39195-A7944-B33 | Cable | UCS DC connection --> -48V connection |

*Figure 19 DC connection with UP/L80XF cabinet, nonredundant (IM Version)*

***IMPORTANT:*** In Canada and U.S., a DC input configuration is not available.

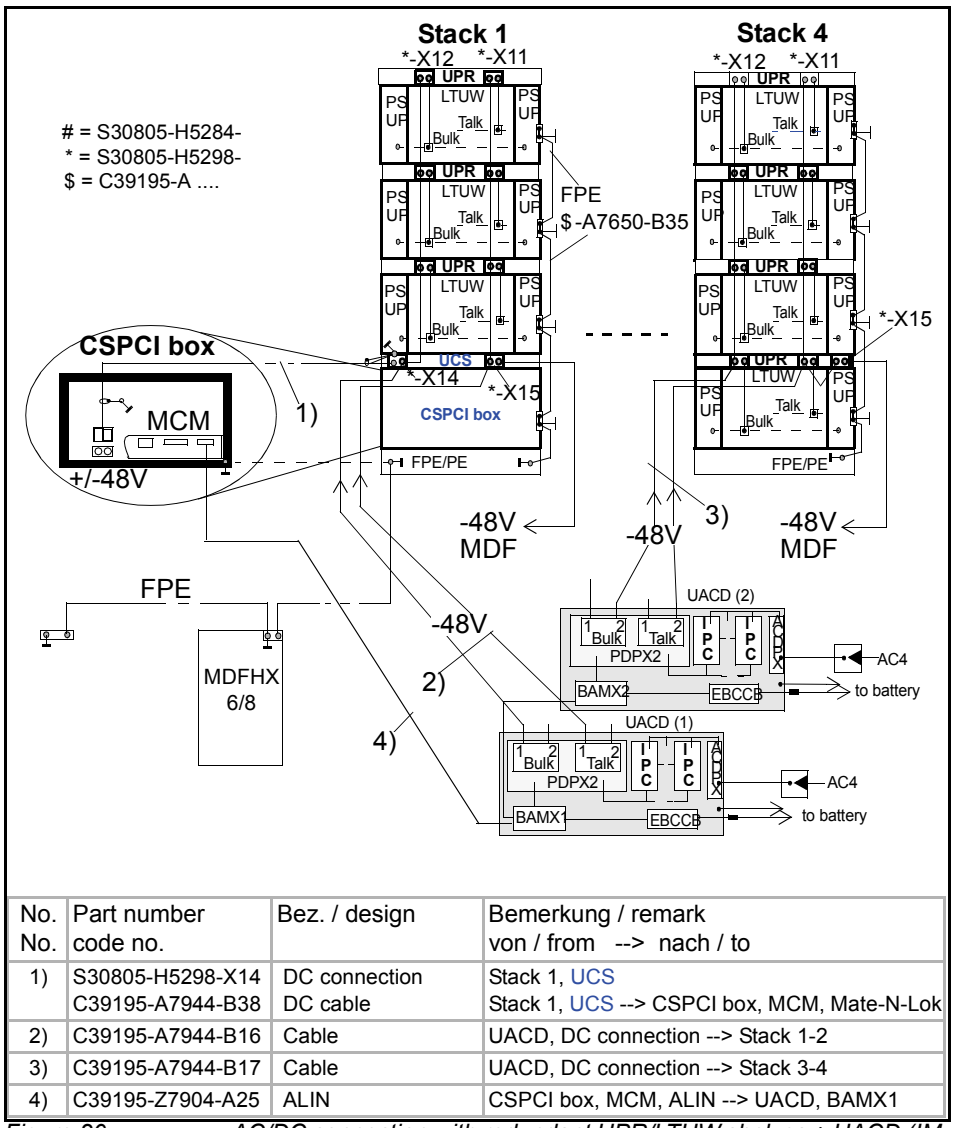
## 7.12 AC-to-DC Connection with a Redundant LTUW Cabinet

In systems with redundant power supply, there are two PSUP power supplies per LTUW. A –48 V output is provided to each power supply from a separate power box using the backplane, that is, the ~230 Vac is directly connected to the power box and not to the system.

An AC-powered HiPath 4000 supports one stack of two UACD cabinets.

An external battery connection can also be used to support the power supply.

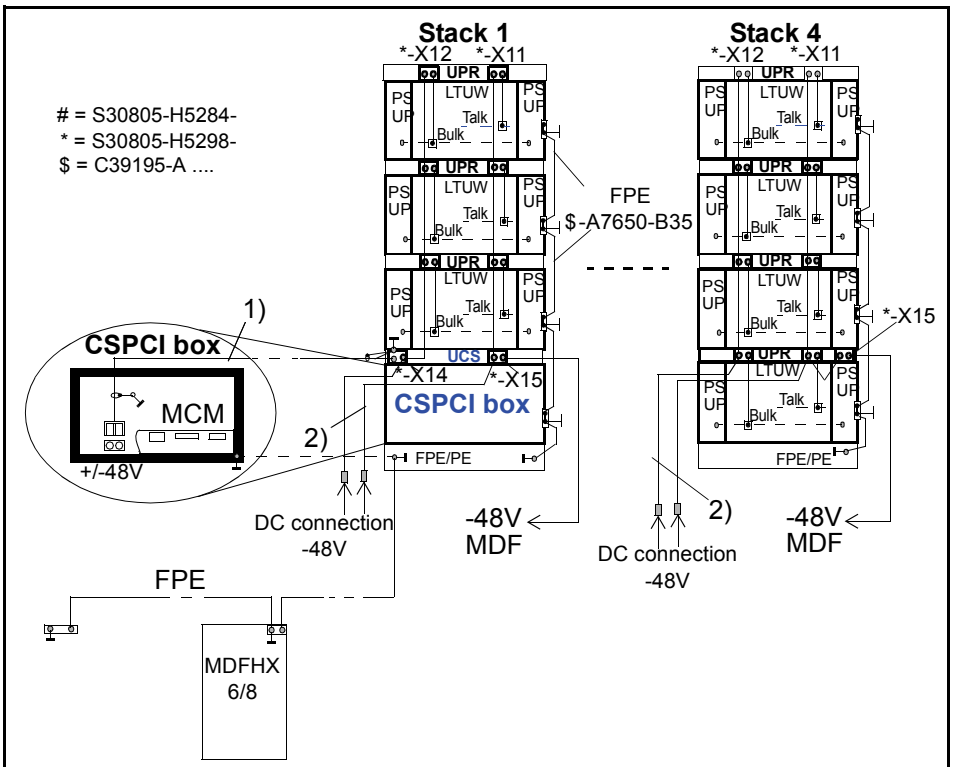
***IMPORTANT:*** In North America, an external battery is not supported.




| No.<br>No. | Part number<br>code no. | Bez. / design | Bemerkung / remark<br>von / from --> nach / to |
|---|---|---|---|
| 1) | S30805-H5298-X14<br>C39195-A7944-B38 | DC connection<br>DC cable | Stack 1, UCS<br>Stack 1, UCS --> CSPCI box, MCM, Mate-N-Lok |
| 2) | C39195-A7944-B16 | Cable | UACD, DC connection --> Stack 1-2 |
| 3) | C39195-A7944-B17 | Cable | UACD, DC connection --> Stack 3-4 |
| 4) | C39195-Z7904-A25 | ALIN | CSPCI box, MCM, ALIN --> UACD, BAMX1 |

*Figure 20 AC/DC connection with redundant UPR/LTUW shelves + UACD (IM version)*

# 7.13 DC Connection with Redundant UPR/LTUW Box, I.M.



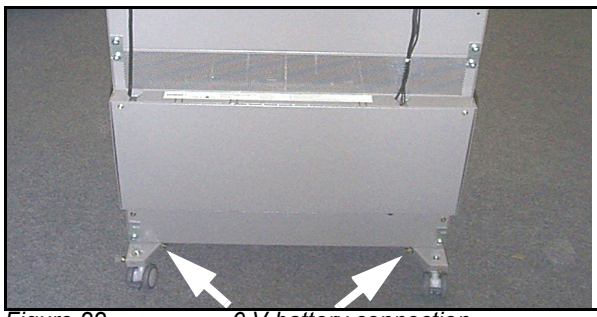

| No.<br>No. | Part number<br>code no. | Bez. / design | Bemerkung / remark<br>von / from --> nach / to |
|---|---|---|---|
| 1) | S30805-H5298-X14<br>C39195-A7944-B38 | DC connection<br>DC cable | Stack 1, UCS<br>Stack 1, UCS --> CSPCI box, MCM, Mate-N-Lok |
| 2) | C39195-A7944-B33 | Cable | UCS, DC connection --> -48V connection |

*Figure 21 DC connection with redundant UPR/LTUW shelves, I.M.*

## 7.13.1 Connecting the Battery to the Power Box, I.M.

To connect an external battery to the HiPath 4000:

1. Connect the 0 V supply from the battery to the roller base of the power box (see Figure 22).



The arrows indicate the points where a 0 V battery connection is made to the power box.

*Figure 22 0 V battery connection*

2. Attach the –48 V supply from the external battery to the cable drawn from the system (see Figure 23).

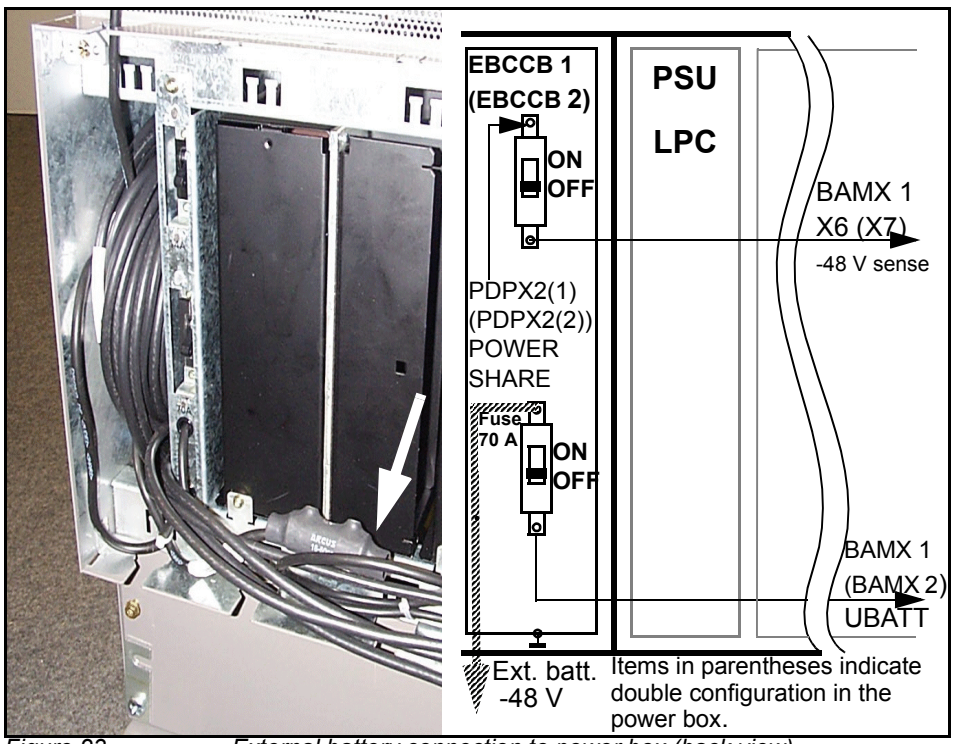



*Figure 23 External battery connection to power box (back view)*

## 7.13.2 Connecting the MDF for a Nonredundant, System, I.M.

***IMPORTANT:*** In Canada and U.S., the UPS provides AC power only. It is not a source of DC power.

The power supply for the main distribution frame is branched from extension boxes 1 and 2 and connected to the main distribution frame by means of fuse modules (Si1/Si2), each with 1.6 A fuses (see Figure 24 and Figure 25). The –48 V connectors from the MDFs can be combined as required. Ensure that the number of MDFs connected at a fuse does not exceed the overall power requirement for each 1.6 A fuse.

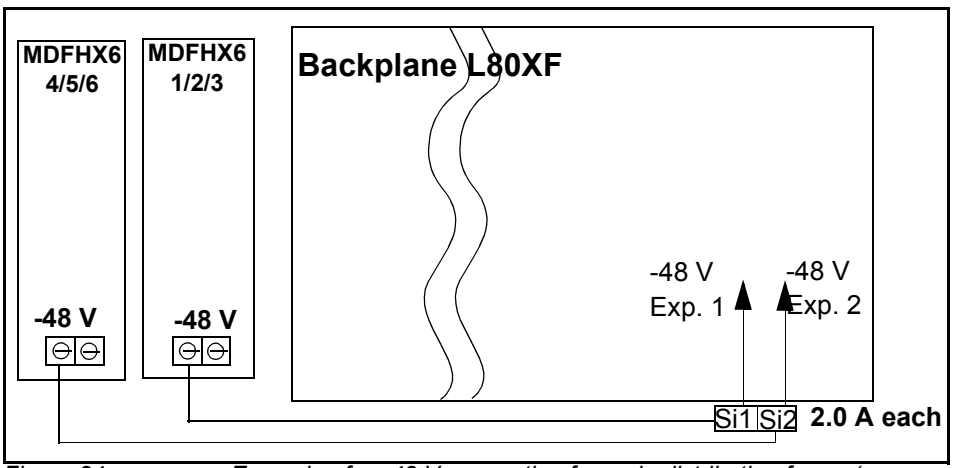
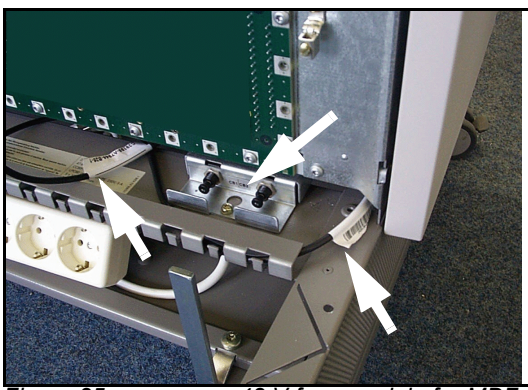



*Figure 24* *Example of a –48 V connection for main distribution frame (nonredundant)*

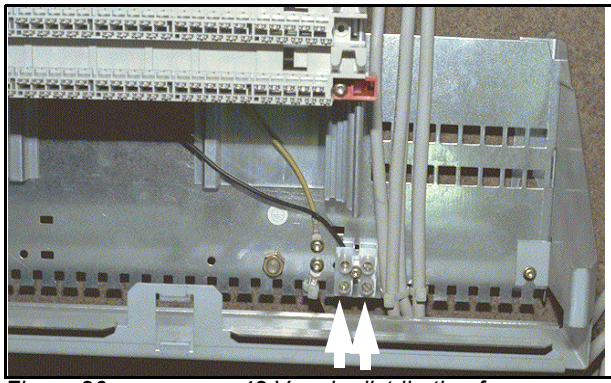


The arrows indicate the -48 V cables and fuse module (Si1, Si2). The cable from Si1 is connected to MDF 1/2/3. The cable from Si2 is connected to MDF 4/5/6.

Fuses:

L80XF = 2.0 A
LTUW (X15) = 1.6 A

*Figure 25* *-48 V fuse module for MDF (nonredundant)*



The arrows indicate the connection for -48 V on the main distribution frame. The -48 V cables from the various fuses must be connected here.

If necessary, this connection can also be connected to other main distribution frames (up to a maximum power consumption of 1.6 A per fuse).

*Figure 26 -48 V main distribution frame connection*

# 7.14 AC-to-DC Connection with AP 3700

The following shows the AC and DC connections for the AP 3700 (base and expansion cabinet).

## 7.14.1 AC Connection AP 3700-9/AP 3700-13

Figure 27 shows the power inputs for the AP 3700-9 and AP 3700-13.

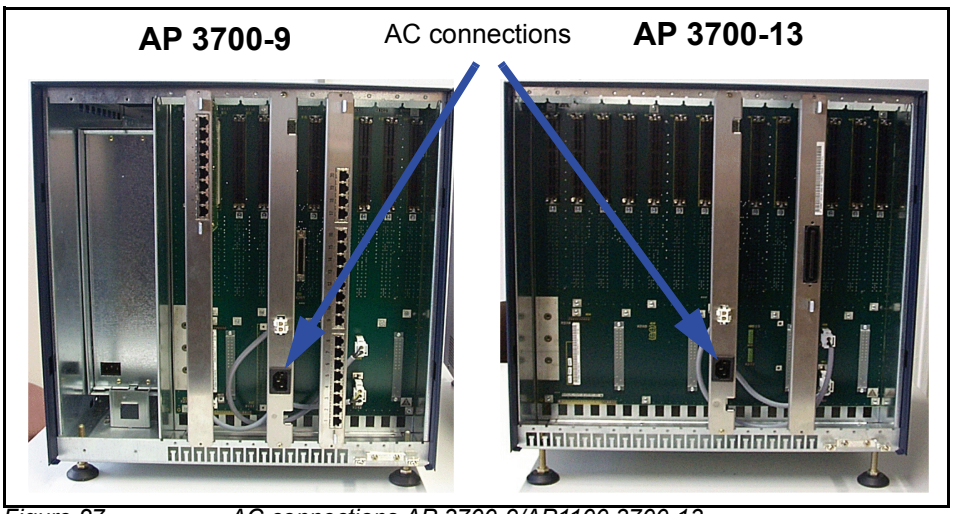



*Figure 27 AC connections AP 3700-9/AP1100 3700-13*

## 7.14.2 DC Connection AP 3700-9/AP 3700-13

Figure 28 shows the DC inputs for the AP 3700-9 and AP 3700-13.

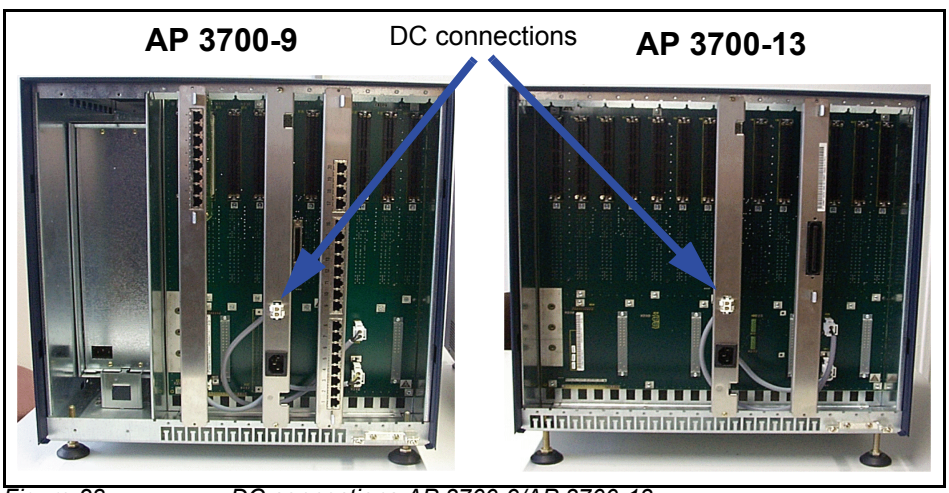



*Figure 28 DC connections AP 3700-9/AP 3700-13*

## 7.14.3 AC Connection AP 3700 in 19" Cabinet

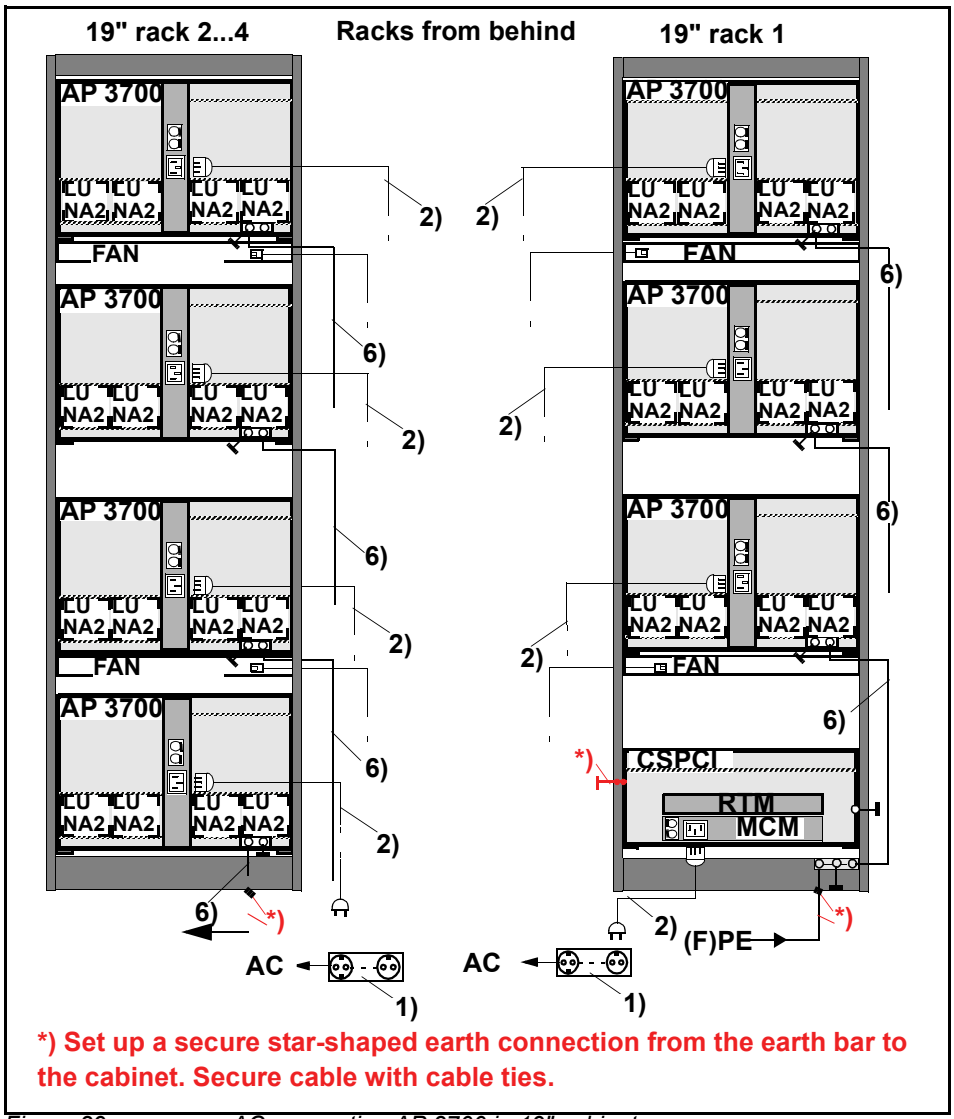



*Figure 29 AC connection AP 3700 in 19" cabinet*

## 7.14.4 DC Connection AP 3700 with DCDR (Fuse Unit)

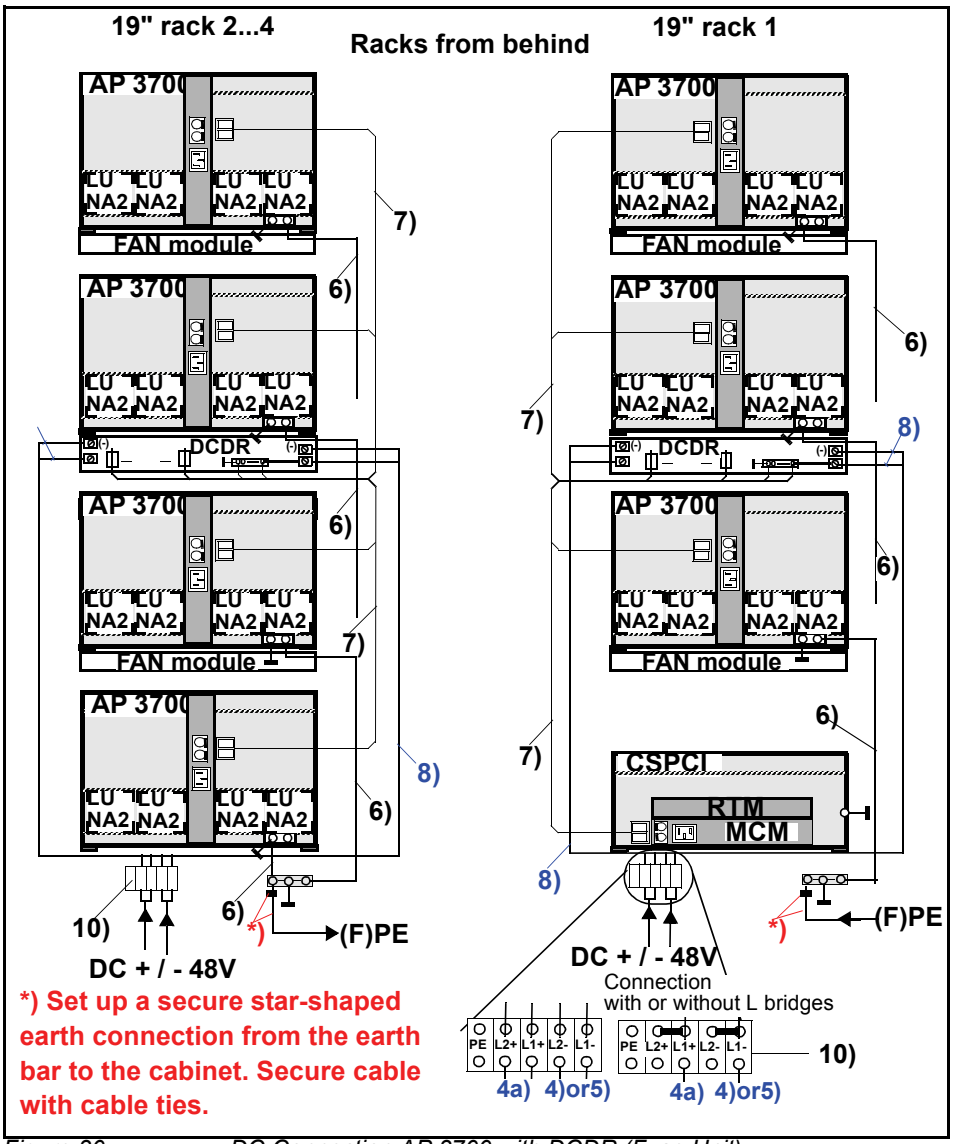



*Figure 30 DC Connection AP 3700 with DCDR (Fuse Unit)*

Table 2 lists the cables to be used when the AP 3700 is to have AC/DC wiring in the 19" cabinet (see the numbers in Figure 29 and Figure 30).

| No. | Part number | Name | From | To | Remark |
|---|---|---|---|---|---|
| 1) | from the rack vendor | AC multiple socket outlet | 19-inch rack, AC multiple socket outlet | Housing instal-lation | |

*Table 2 Cables for AP3700 AC/DC connection in the 19" cabinet*

| No. | Part number | Name | From | To | Remark |
|---|---|---|---|---|---|
| 2) | C39195-Z7001-C17 or C39195-Z7001-C19 | Power cable | CSPCI / AP 3700 | AC multiple socket outlet 230V | f. IM<br><br>f. NA |
| 3) | S30805-H5298-X10 with 2x C39195-A7944-B57 | DC connection line | 19" rack, 2x Si 1+2 | CSPCI / AP 3700 | Interim sol-ution |
| 4) | C39195-A7944-B16/17 | Cable | UACD (1), (2) -48 V, Bulk/Talk -> -48 V, Bulk/Talk -> | Rack 1 ... 4, DC connection -X10 or terminal block (see no.10) | |
| 4a) | C39195-A7556-B540 | Cable 0 V | UACD earth bar | Terminal block, see no.10 | |
| 5) | C39195-A7954-B33 | Cable | DC -48-V feed | Rack 1 ... 4 DC connection. -X10 | Interim sol-ution |
| 6) | C39195-A7650-B250 | Cable 10 $mm^2$ | AP 3700 - grounding connector | Central ground point in the rack | (F)PE |
| 7) | C39195-A7944-B56 | Cable +/- 48 V | 19" rack, DCDR Si F01/F02/F32 and F31 | CSPCI / AP 3700 | Series |
| 8) | from the DCDR vendor S30122-X8019-X4 | Cable 2 x +/-48 V | 19" rack, DCDR | Terminal block in 19-inch rack, | included |
| 9) | C39195-A7488-B800 | Cable | Rack, central ground point | External earth bar | |
| 10) | S30122-X8018-X2 | Terminal block | Installed in 19" rack | | include-ed |

*Table 2 Cables for AP3700 AC/DC connection in the 19" cabinet*

## 7.14.5 DC Connection AP 3700 with DCDR (DC Kit for 19-Inch Cabinet)

This chapter once again describes DC connection to the DCDR fuse unit if the delivery includes a “DC kit” for 19-inch cabinet installation in the AP 3700 cabinets.

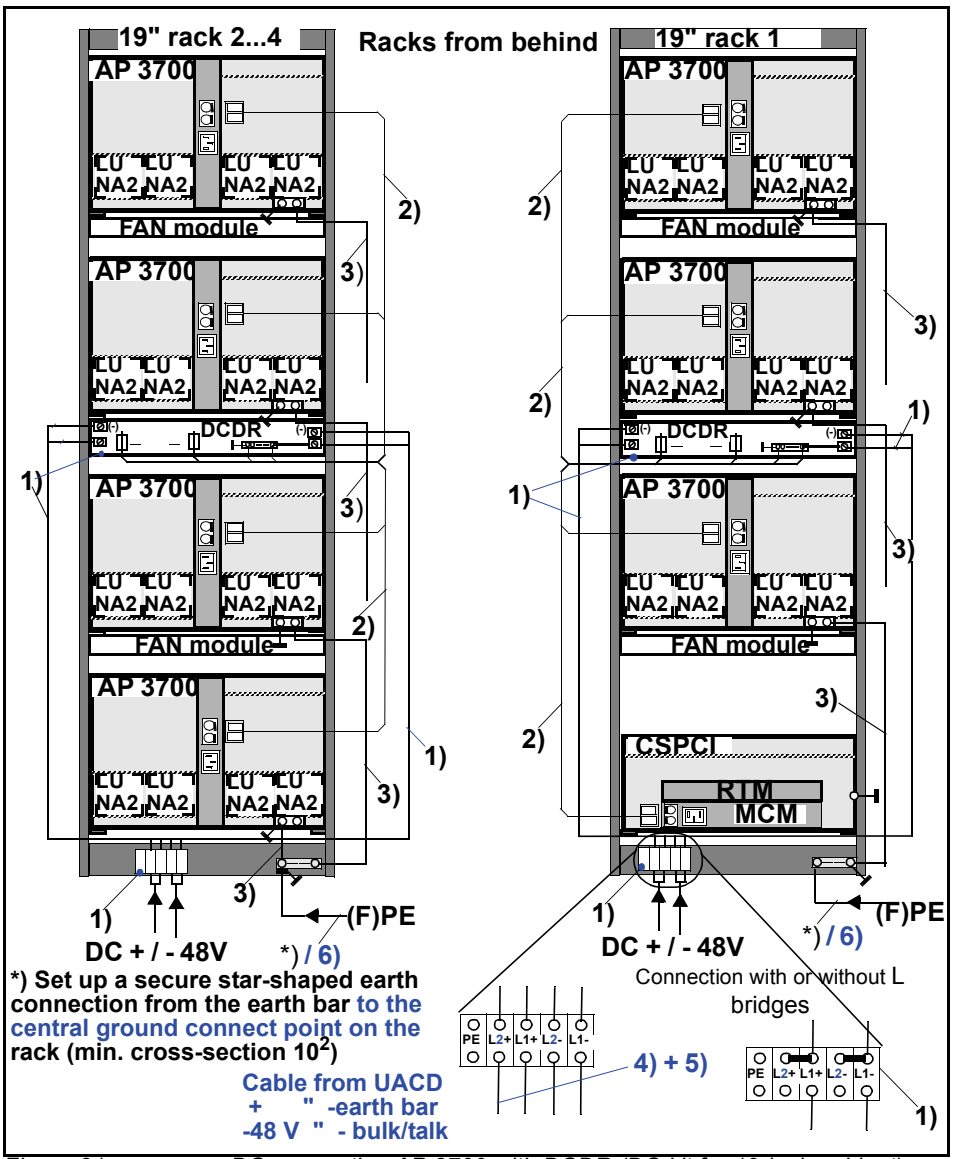



*Figure 31 DC connection AP 3700 with DCDR (DC kit for 19-inch cabinet)*

## 7.14.6 DCDR Connection from Behind

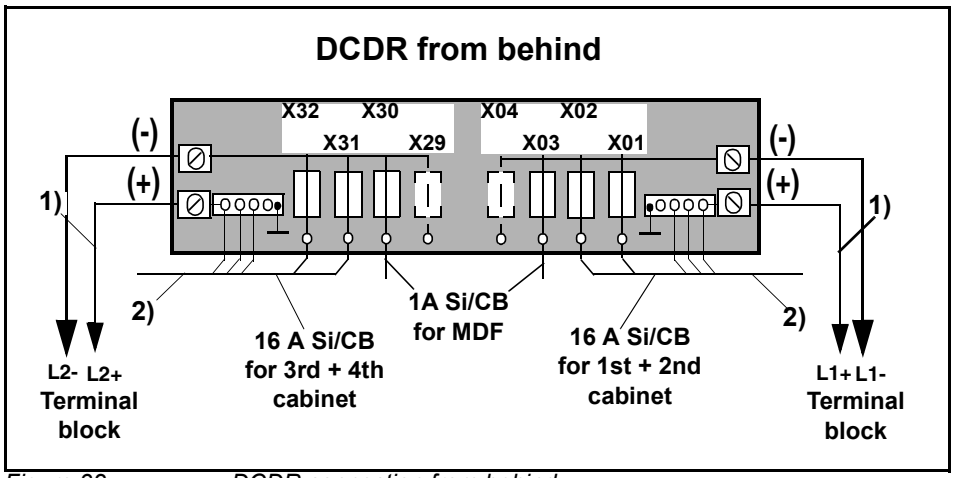



*Figure 32 DCDR connection from behind*

Table 3 lists the cables to be used for DC wiring in the AP 3700 in the 19-inch cabinet (see numbering in Figure 31 and Figure 32).

| No. | Part number | Name | From | To | Remark |
|---|---|---|---|---|---|
| 1) | from DCDR manufact. S30122-X8019-X4 | Cable 2 x +/-48V, $16^2$ | 19" rack, DCDR | Terminal block in 19-inch rack, S30122-X8018-X2 | |
| 2) | C39195-A7944-B56 | Cable +/- 48V | 19" rack, DCDR Si/CB F01/F02/ F32 and F31 | CSPCI / AP 3700 | |
| 3) | Installation materials | Cable 10 $mm^2$ | AP 3700 - grounding connector | Rack, central ground point central rack PE point | (F)PE |
| 4) | C39195-A7944-B16/17 from S30805-G5405-X | Cable -48 V, $10^2$ | UACD (1), (2) -48 V, Bulk/Talk -> | Rack 1 ... 4, Terminal block | |
| 5) | C39195-A7556-B540 from S30805-G5405-X | Cable 0 V, $10^2$ | UACD earth bar | Rack 1 ... 4, Terminal block | |
| 6) | C39195-A7488-B800 | Cable 35 $mm^2$ | Rack, central ground point central rack PE point | External earth bar | (F)PE |

*Table 3 Cables for DC connection of AP 3700 in the 19-inch cabinet*

Figure 33 shows the DCDR fuse unit for the 19" installation version


*Figure 33 DCDR fuse unit for 19" installation*

**Technical specifications**

Dimensions: Width = 435 mm,Depth = 205 mm, Height = 90 mm, Installation height = 2 U

Weight: Complete with fuses approx. 4kg

The power supply connection cables are also supplied (see SK S30122-K7698-X).

Fixing screws for DCDR and the terminal block for rack installation should be obtained from the rack vendor for the specific rack used.

---

***NOTE:*** The breaker panel unit DCDR must always be installed above a CSPCI or AP3700-9/13.

---

Operating characteristics of DCDR:

- Operating voltage: 80 Vdc (the HiPath 4000 system always requires 60 Vdc)
- Total current per side: 80 A
- Maximum nominal current for automatic circuit breaker per slot: 25 A

---

***IMPORTANT:***
- The approved 16-A automatic circuit breaker (V39118-Z7180-A6) should always be used to connect the cabinets CSPCI, AP3700-9, and AP 3700-13.

- In the case of LM orders based on the project planning procedures, the 16-A automatic circuit breakers are automatically planned depending on the configuration.

- For each DCDR, two 1-A automatic circuit breakers (V39118-Z7180-A8) are provided in advance for the connection of external devices.

- An order with part number is required in all other cases (for example, additional requirements).

---

- Cable cross-section: 35 $mm^2$
- Short-circuit current: 3000 A

## 7.14.7 DC Connection of AP 3700 to the MDF

To set up a -48-V connection from an AP 3700 cabinet to an MDF, an appropriate fuse panel must first be installed on the back of the AP 3700 because this does not have a -48-V fuse for the MDF.

For information on where to install and connect the fuse panel, refer to Figure 34.

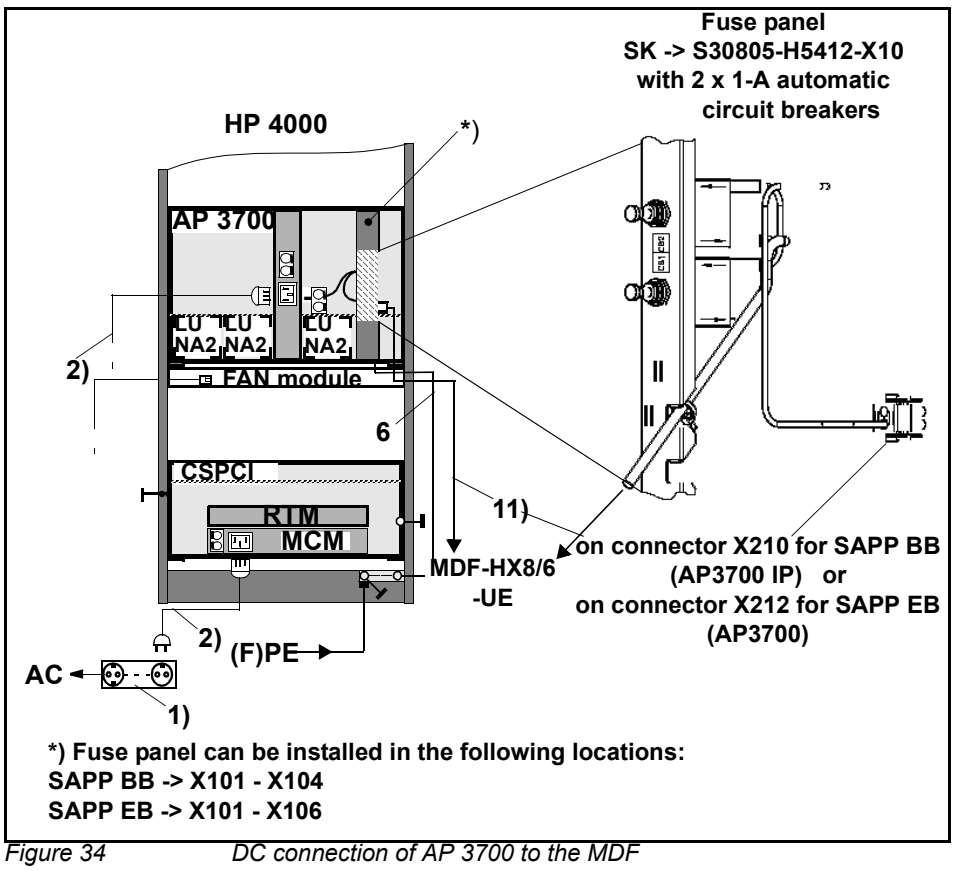



*Figure 34 DC connection of AP 3700 to the MDF*

# 7.15 UACD (PSR930/PSR930E) 19-Inch Installation

The UACD power box (PSR930/PSR930E) is a new AC/DC power box for use in 19-inch cabinets.

It consists of the following 19-inch mounting units:

- Base cabinet PSR930 (with basic controller board A901)
- Expansion cabinet PSR930E

***IMPORTANT:***
- The UACD power box (PSR930/PSR930E) may only be installed in a separate, closed 19" cabinet. This cabinet must ensure mechanical and electrical protection and may only be serviced by authorized service personnel.
- All PSR930 lines (in the 19" cabinet) must be secured with an appropriate cord grip (e.g. cable tie).

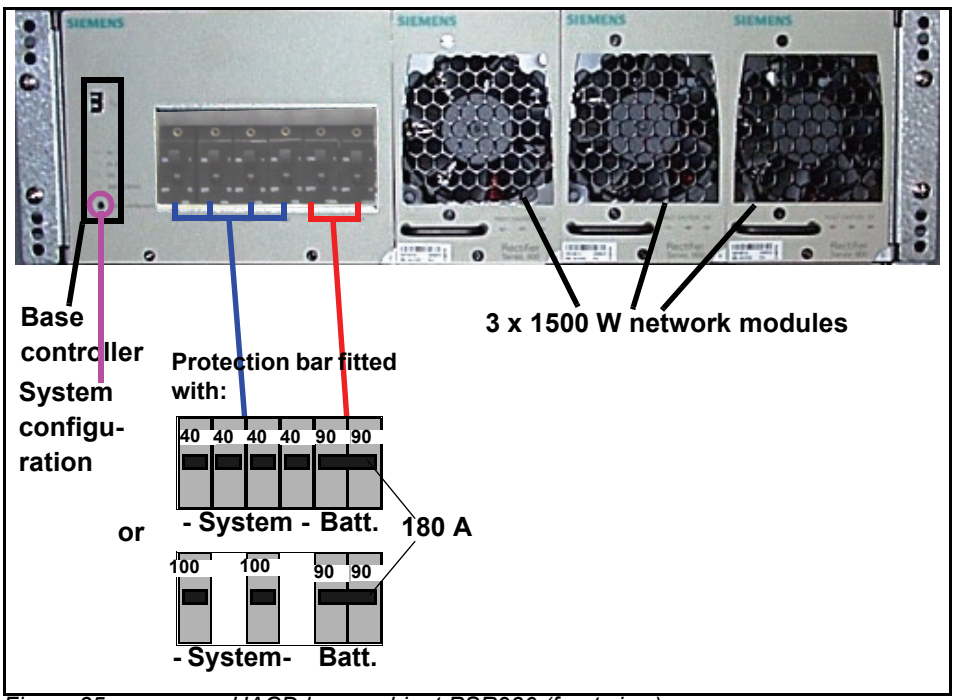



*Figure 35 UACD base cabinet PSR930 (front view)*

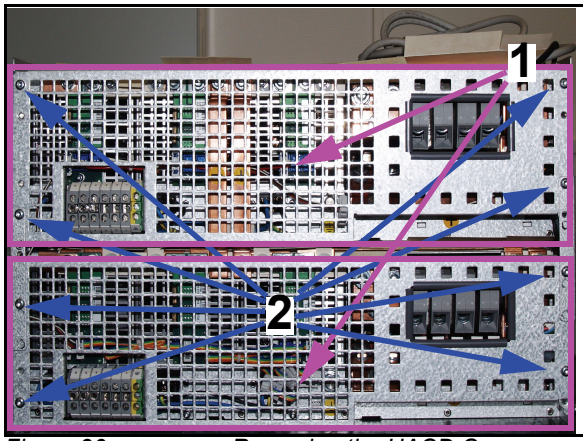
The UACD expansion cabinet PSR930E has the same structure as the base cabinet minus the base controller.

***IMPORTANT:***
- Before starting up the power, ensure that all network modules on the front are securely screwed into the shelf to guarantee a secure contact.
- If you need to replace a network moduleor change the number of network

modules,you must hold down the "System configuration" button for at least 3s on the controller (seeFigure 35) after the replacement/expansiob to ensure that the new network module can be reassigned to the alarm system.

---

To connect the power supply cables to an UACD, you must first remove the rear covers.

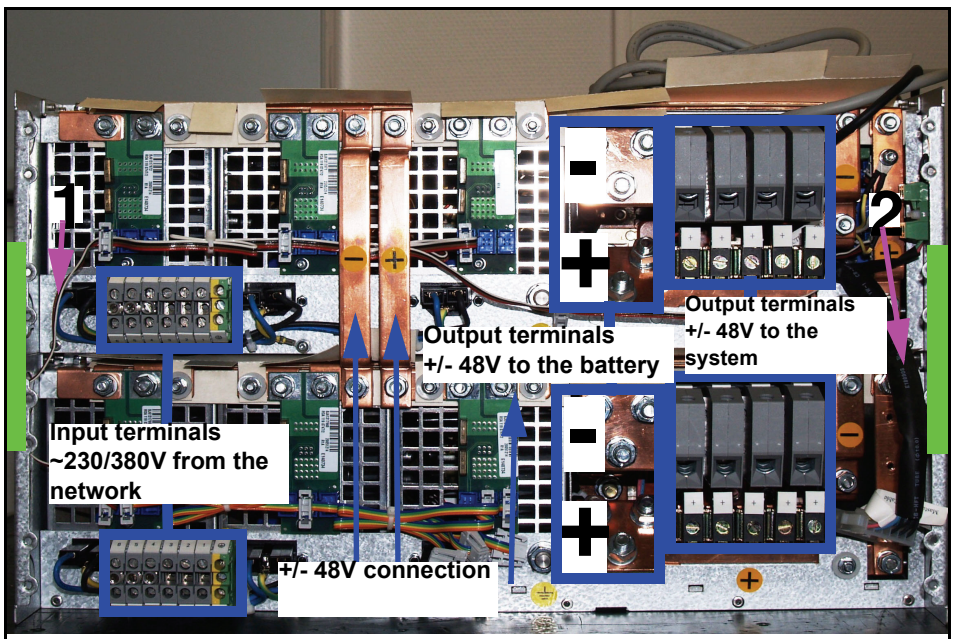



First of all, remove the cover panel (1) at the back of the UACD by removing the lateral fixing screws (2).

*Figure 36 Removing the UACD Cover*

Figure 37 shows the UACD base and expansion cabinet PSR930/PSR930E.

***IMPORTANT:*** The base and expansion cabinets are physically connected left and right at the rear by a metal bracket (indicated in green in Figure 37) (see also the Service Manual).




If a base and expansion cabinet are used, the +/-48V are connected as shown in this image.

*Figure 37 UACD power box PSR930/PSR930E (back view)*

To establish communication with the expansion cabinet, first connect the base cabinet's relevant bus cable (1) to the expansion cabinet. Then plug the base cabinet's contactor control monitoring cable (2) into the expansion cabinet (see also the Service Manual).

***IMPORTANT:*** To connect the +/-48V to the system at the UACD's output terminals (see Figure 37), you must first remove the blue cable connector at one end of the cable supplied and strip the wire. This cable is connected directly to the terminals.

## 7.15.1 UACD Power Box Part Numbers (PSR930/ PSR930E)

Table 4 provides an overview of the equipment (and corresponding part numbers) used in PSR930/PSR930E.

| Qty. | Name | Part number | Remark |
|---|---|---|---|
| **1** | **PSR930 (1)** | **EZY:S30050-G6383-X100** | **Power supply and distribution cabinet** |
| 3 | Rec/mod. GR90 1500W | EZY:S30050-K6383-X | Rectifier (network module), *order separately* |
| 1 | Base Controller | EZY:S30050-Q6383-X100 | for spare parts order |
| 4 | Circuit Breaker 40A | V39118-Z7180-A11 | Overload protection for system **or** |
| 2 | Circuit Breaker 100A | V39118-Z7180-A12 | Overload protection for system |
| 1 | Circuit Breaker 180A | V39118-Z7180-A14 (2x90A) | Overload protection for the battery |
| | | | |
| **1** | **PSR930E (2)** | **EZY:S30050-G6383-E100** | **Power supply and distribution cabinet, expansion** |
| 3 | Rec/mod. 48V/1500W | EZY:S30050-K6383-X | Rectifier (network module), order separately |
| 4 | Circuit Breaker 40A | V39118-Z7180-A11 | Overload protection for system **or** |
| 2 | Circuit Breaker 100A | V39118-Z7180-A12 | Overload protection for system |
| 1 | Circuit Breaker 180A | V39118-Z7180-A14 (2x90A) | Overload protection for the battery |

*Table 4 Equipment in PSR930/PSR930E*

## 7.15.2 AC/DC Connection with UACD (PSR930/ PSR930E) in 19” Cabinet with AP3700

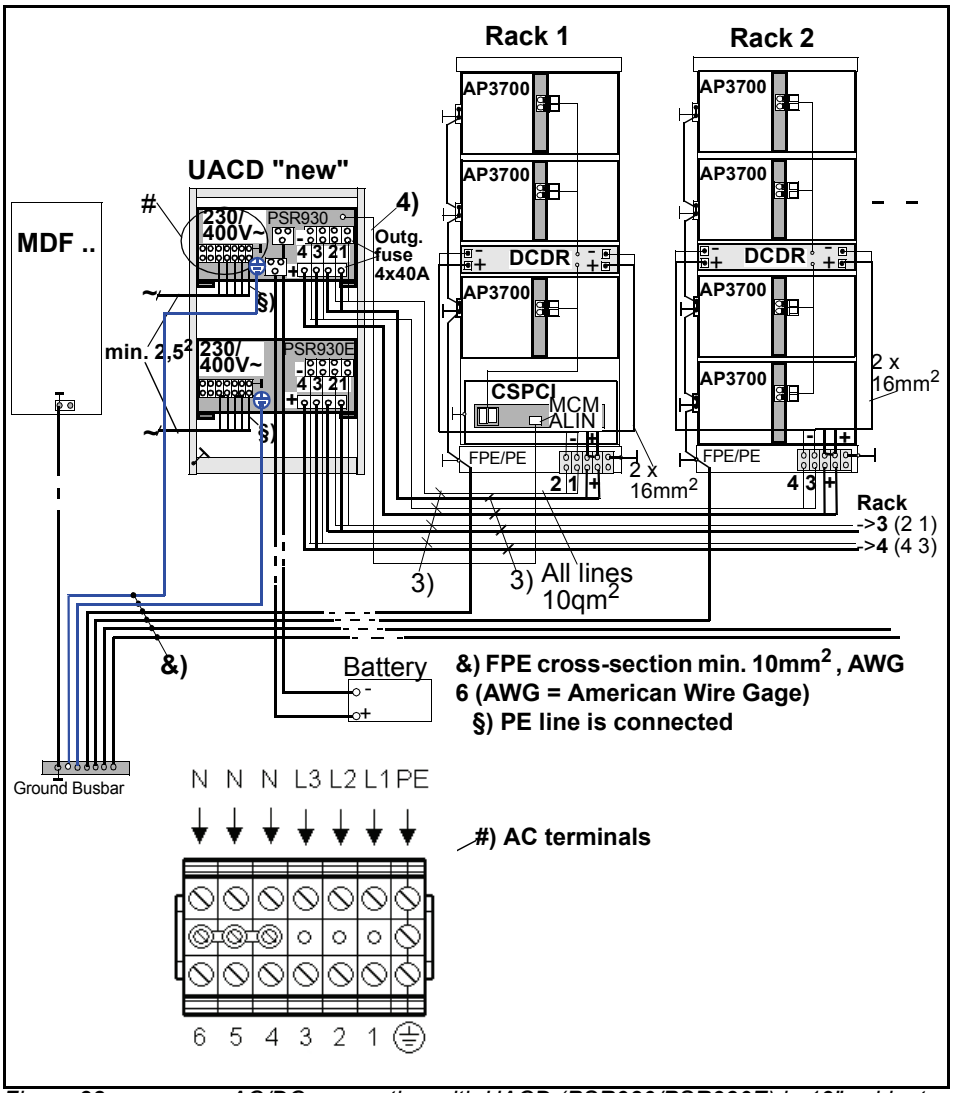



*Figure 38* *AC/DC connection with UACD (PSR930/PSR930E) in 19” cabinet with AP3700*

## 7.15.3 AC/DC Connection with UACD (PSR930/ PSR930E) in 19” Cabinet with UPR/LTUW

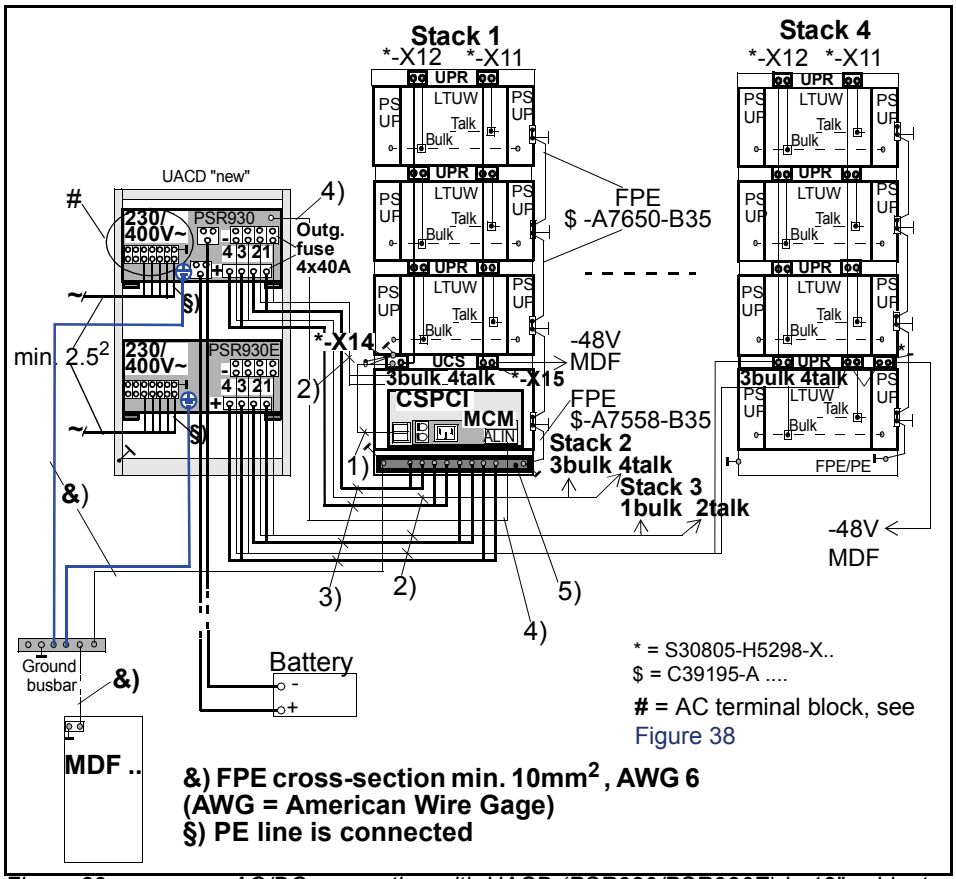



*Figure 39 AC/DC connection with UACD (PSR930/PSR930E) in 19” cabinet with UPR/LTUW*

Table 5 refers to Figure 38 and Figure 39.

| Qty. | Name | Part number | Remark (from --> to) |
|---|---|---|---|
| 1) | DC cable | S30805-H5298-X14<br>C39195-A7944-B38 | Stack 1, UCS, -X14 --> CSPCI, Mate-N-Lok connector |
| 2) | - Cable | C39195-A7944-B16/17 | UACD, PSR930/930E --> Stack 1.... 4 |
| 3) | + Cable | C39195-A7556-B540 | UACD, PSR930/930E --> Stack 1, 0-V busbar |
| 4) | ALIN cable | Cable length supplied: 2.5 m | UACD, PSR930, base controller --> CSPCI, MCM, ALIN |
| 5) | 0-V busbar | C39165-A7080-D1 | Mounted in stack 1 on the roll plate |

*Table 5 Cable table for UACD (PSR930/930E)*

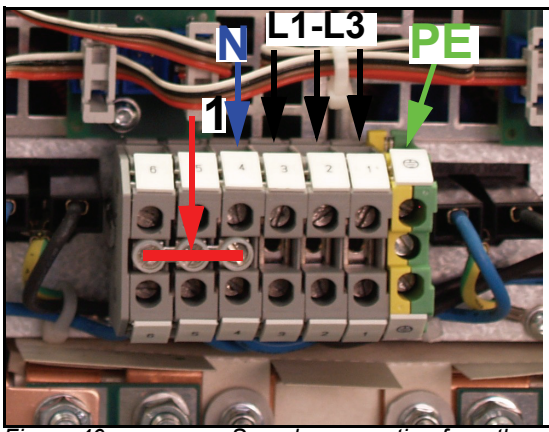
## 7.15.4 Mains Connection Variants for UACD (PSR930/ PSR930E)

The following country-specific mains connection variants are available for UACD (PSR930/930E):

### 7.15.4.1 Installing a Three-Phase Network

With a three-phase network, the 3 neutral wires are connected with a contact jumper (1). Connect the corresponding power line as illustrated below.

Figure 40 shows the mains connection to the UACD for a three-phase network.




1. First connect the ground wire (PE).
2. Connect the neutral wire (N) to one of the three terminals provided for this purpose.
3. Now connect the three phases L1, L2 and L3.

**Overload protection:**

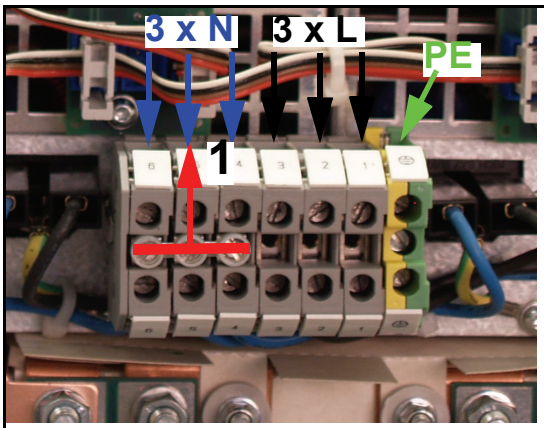
3 x 10A per phase (400Vac)

*Figure 40 Sample connection for a three-phase network (PSR930/PSR930E)*

### 7.15.4.2 Installing a Single-Phase Network

The jumper (1) - if still installed - must be removed for a single-phase connection. Connect the corresponding power line as illustrated below.

Figure 41 shows the mains connection to the UACD for a one-phase network.




1. First of all unscrew the jumper (1) connected to the three neutral conductors.
2. Connect the ground wire (PE).
3. Connect the three individual neutral conductors (N).
4. Connect the three individual phases (L).

**Overload protection:**

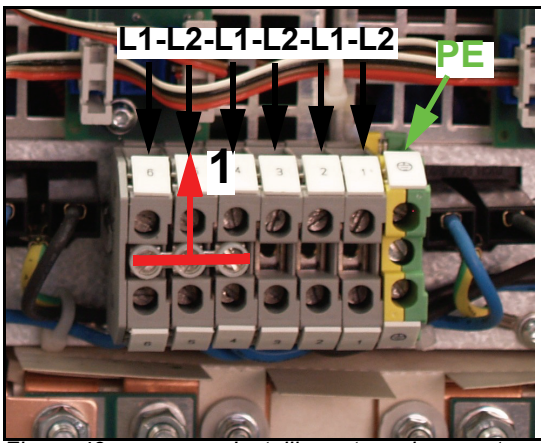
3 x 10A per phase (230Vac)

*Figure 41 Installing a single-phase network (PSR930/PSR930E)*

### 7.15.4.3 Installing a Two-Phase Network

The jumper (1) - if still installed - must be removed for a two-phase connection. Connect the corresponding power line as illustrated below.

Figure 42 shows the mains connection to the UACD for a two-phase network.




1. First of all unscrew the jumper (1) connected to the three neutral conductors.
2. Connect the ground wire (PE).
3. Connect the individual phases (L1/L2).

**Overload protection:**

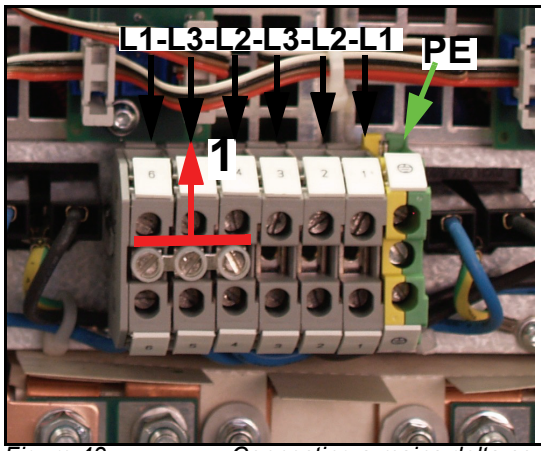
6 x 10 A per phase (230 Vac or 2 x 115 Vac)

*Figure 42 Installing a two-phase network (PSR930/PSR930E)*

### 7.15.4.4 Installing a Mains Delta Connection

The jumper (1) - if still installed - must be removed for a mains delta connection. Connect the corresponding power line as illustrated below.

Figure 43 shows the mains connection to the UACD for a mains delta connection.




1. First of all unscrew the jumper (1) connected to the three neutral conductors.
2. Connect the ground wire (PE).
3. Connect the individual phases (L1, L2 and L3).

**Overload protection:**

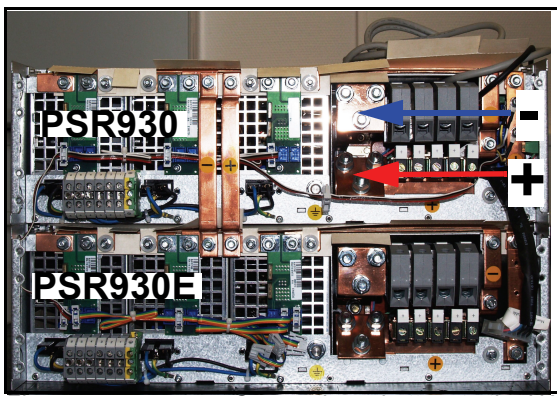
6 x 10 A per phase (230 Vac or 2 x 115 Vac)

*Figure 43 Connecting a mains delta connection (PSR930/PSR930E)*

## 7.15.5 Connecting a Battery to the UACD (PSR930/ PSR930E)

Proceed as indicated in the following diagram to connect a battery to the UACD.

Figure 44 shows how to connect a battery to the UACD (PSR930/PSR930E).




1. First connect the battery cables to the UACD's battery terminals (+/-) indicated in the diagram.
2. Now connect the battery cables to the relevant battery.

*Figure 44 Connecting a battery to the UACD (PSR930/PSR930E)*

***IMPORTANT:*** The UACD's temperature sensor must be disconnected if it is not in use or if the battery is located at a distance of over 20m from the power box.

## 7.16 UACD

Figure 45 shows the UDCD DC-to-DC power box.

***IMPORTANT:*** The EBCCB is not used in the U.S.

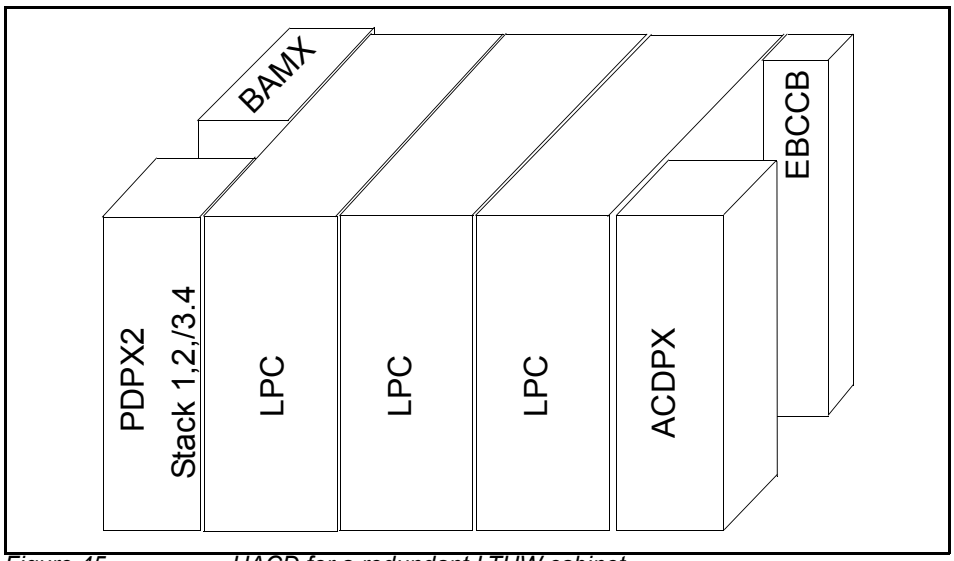



*Figure 45 UACD for a redundant LTUW cabinet*

### 7.16.1 UACD Equipment Part Numbers

Table 6 lists the equipment and corresponding part numbers of the UACD.

| Qty. | Name | Part number | Description |
|---|---|---|---|
| **1** | **UACD (1)** | **S30805-G5405-X** | **Power supply and distribution cabinet for HiPath 4500** |
| 1 | ACDPX | S30050-K7028-X1 | Power supply field |
| 3 | LPC, NG-Module | S30807-H6120-X1/X2 | Component parts for main power supply modules with cable types |
| 1 | PDPX2 | S30807-E6250-X | Terminal field |
| 1 | BAMX1<br>BAMX1<br>BAEX | S30805-H5401-X11<br>S30807-K6215-X1<br>S30050-Q7048-X | Battery Manager 1, kit<br>Battery Manager 1<br>Battery control and power failure management |
| 1 | EBCCB | S30807-K6710-X | Battery connection with safety cutout |
| | | | |

*Table 6 UACD equipment part numbers for a redundant LTUW cabinet*

| Qty. | Name | Part number | Description |
|---|---|---|---|
| **1** | **UACD (2)** | **S30805-G5405-X** | **Power supply and distribution cabinet for HiPath 4500** |
| 1 | ACDPX | S30050-K7028-X1 | Power supply field |
| 3 | LPC, NG-Module | S30807-H6120-X1/X2 | Component parts for main power supply modules with cable types |
| 1 | PDPX2 | S30807-E6250-X | Terminal field |
| 1 | BAMX2<br>BAMX2 | S30805-H5401-X12<br>S30807-K6215-X2 | Battery Manager 2, kit<br>Battery Manager 2 |
| 1 | EBCCB | S30807-K6710-X | Battery connection with safety cutout |

*Table 6 UACD equipment part numbers for a redundant LTUW cabinet*

## 7.16.2 UACD 1 Connections

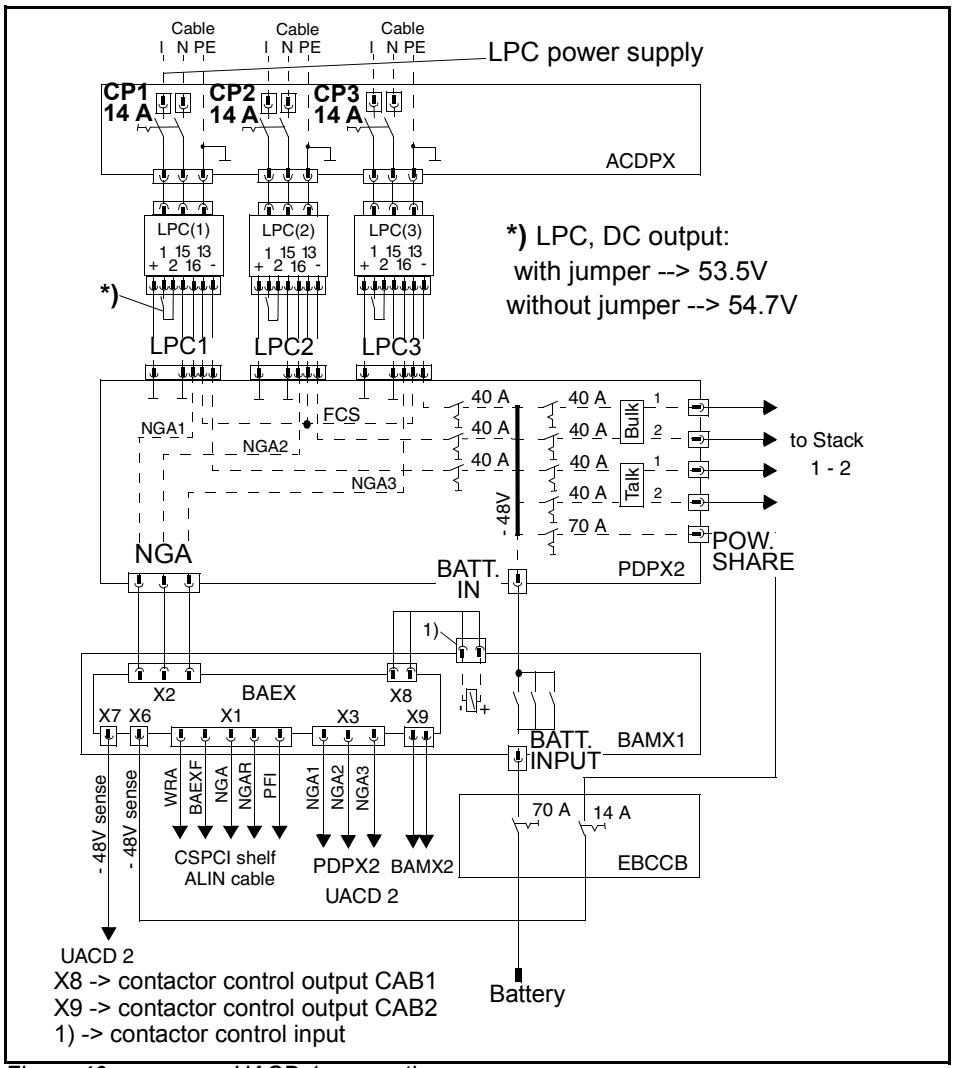



*Figure 46 UACD 1 connections*

## 7.16.3 UACD 2 Connections

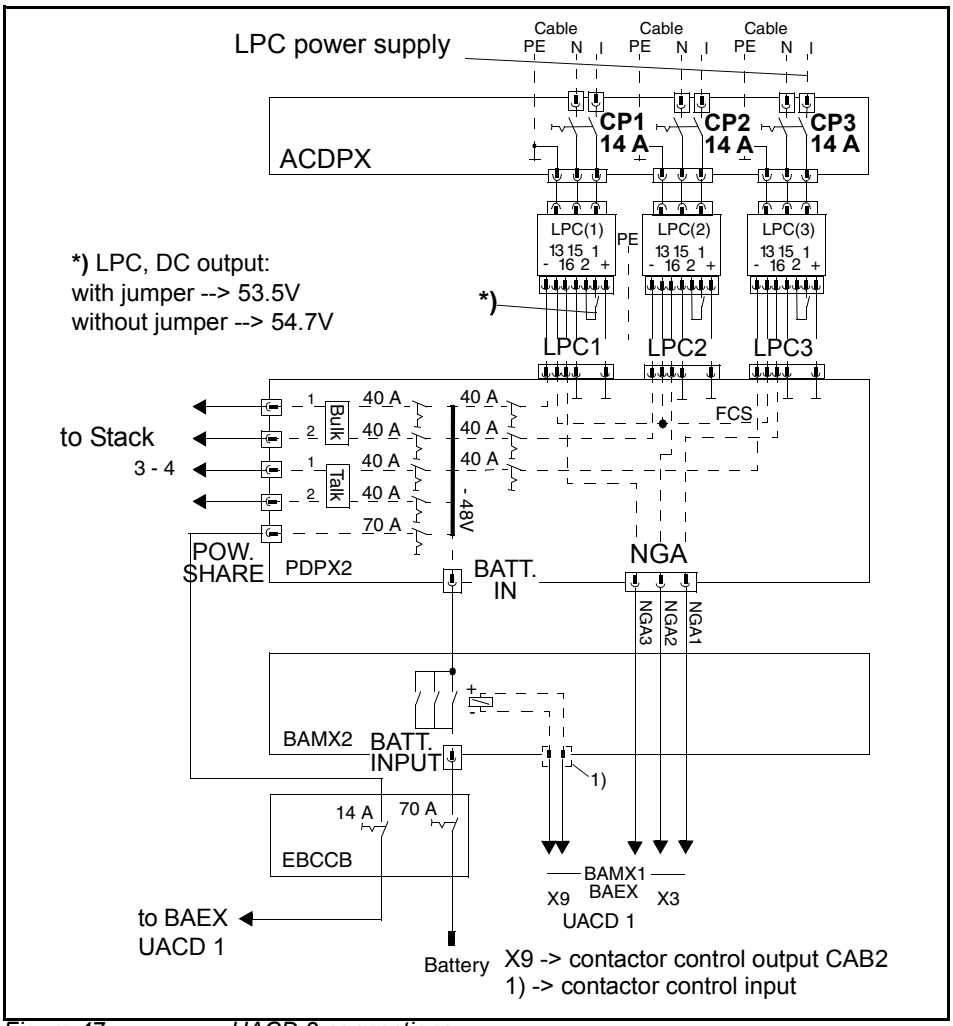



*Figure 47 UACD 2 connections*

## 7.17 Battery Manager Cabinet for L80XF Shelf

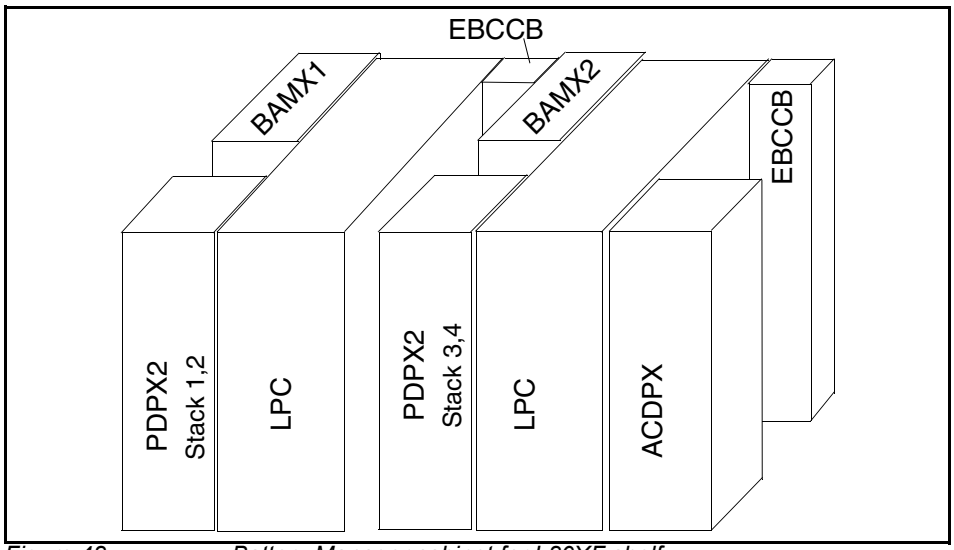



*Figure 48 Battery Manager cabinet for L80XF shelf*

### 7.17.1 Part Numbers for Battery Manager Cabinet

Table 7 lists the equipment and corresponding part numbers of the Battery Manager cabinet.

| Qty. | Name | Part number | Description |
|---|---|---|---|
| **1** | **UACD** | **S30805-G5405-X** | **Power supply and distribution cabinet for H4000** |
| 1 | ACDPX | S30050-K7028-X1 | Power supply field |
| 2 | LPC, NG-Module | S30807-H6120-X1/X2 | Component parts for main power supply modules with cable types |
| 1 | PDPX2 | S30807-E6250-X | DC terminal field |
| 1 | BAMX1<br>BAMX1<br>BAEX | S30805-H5401-X11<br>S30807-K6215-X1<br>S30050-Q7048-X | Battery Manager 1, kit<br>Battery Manager 1<br>Battery Control and Power Fail Management |
| 1 | EBCCB | S30807-K6710-X | Batt. conn. w. automatic circuit-breakers |
| | | | |
| 1 | PDPX2 | S30805-H5401-X10<br>S30807-E6250-X | DC terminal field, kit<br>DC terminal field |
| 1 | BAMX2<br>BAMX2 | S30805-H5401-X12<br>S30807-K6215-X | Battery Manager 2, kit<br>Battery Manager 2 |

*Table 7 Battery Manager cabinet equipment*

| Qty. | Name | Part number | Description |
|---|---|---|---|
| 1 | EBCCB | S30807-K6710-X | Batt. conn. w. automatic circuit-breakers |
| **1** | **UACD** | **S30805-G5405-X** | **Power supply and distribution cabinet for H4000** |

*Table 7 Battery Manager cabinet equipment*

## 7.17.2 Battery Manager, Connection Configurations

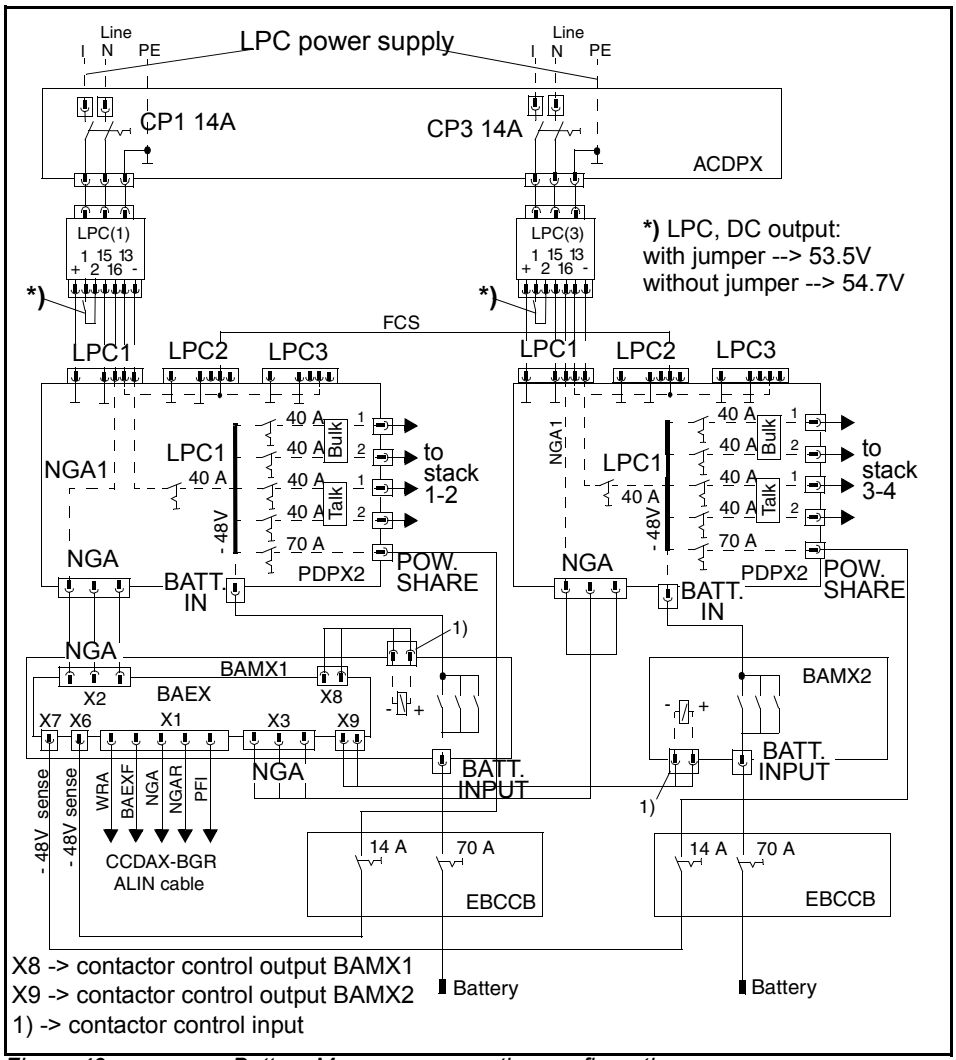



*Figure 49 Battery Manager, connection configurations*

# 7.18 UDCD, North America Only

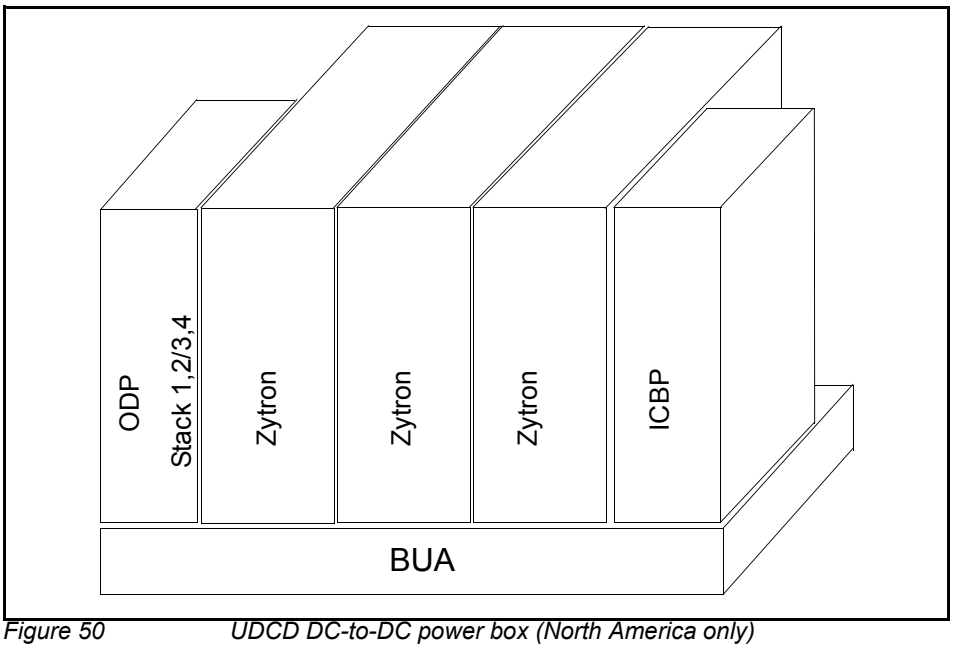



*Figure 50 UDCD DC-to-DC power box (North America only)*

## 7.18.1 UDCD Equipment Part Numbers, North America Only

Table 8 lists the equipment and corresponding part numbers of the UDCD.

| Qty. | Name | Part number | Description |
|---|---|---|---|
| 1 | BUA | S30805-G5409-X | Base Unit (Base unit assembly) |
| | | | |
| 1 | UDCD (1) | S30805-G5406-A | Unit DC Distribution |
| 1 | ICBP | S30807-E6588-X | Input circuit breaker panel |
| 3 | Zytron-Module | S30122-H5308-X | DC-to-DC converter |
| 1 | ODP<br>DCPFX | S30807-E6589-X<br>S30807-Q6220-X | Output distribution panel<br>DC power fail card |
| | | | |
| 1 | UDCD (2) | S30805-G5406-X | Unit DC Distribution |
| 1 | ICBP | S30807-E6588-X | Input circuit breaker panel |
| 3 | Zytron-Module | S30122-H5308-X | DC-to-DC converter |
| 1 | ODP<br>DCPFX | S30807-E6589-X<br>S30807-Q6220-X | |

*Table 8 Equipment for UDCD DC-to-DC power box*

## 7.18.2 Overview of UDCD stack 1 connections

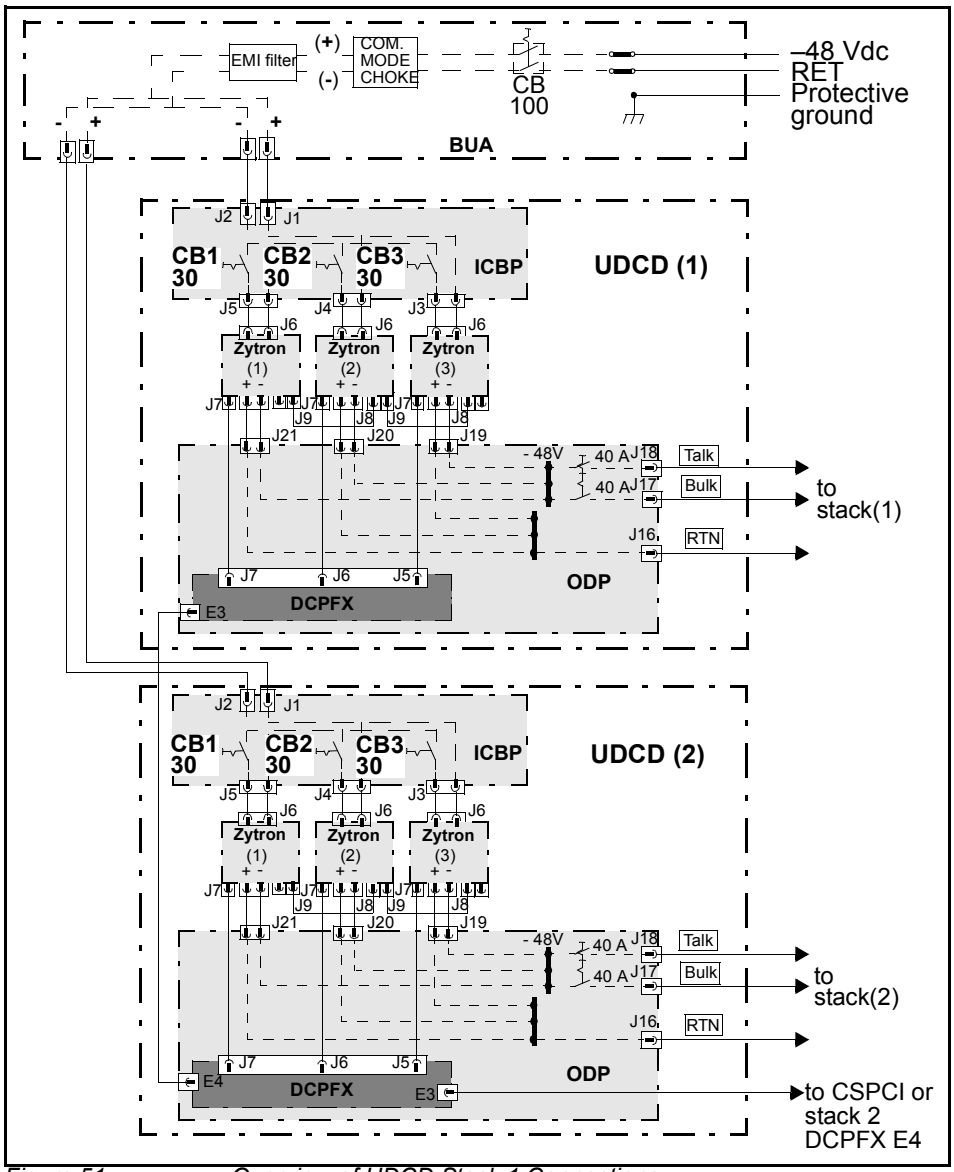



*Figure 51 Overview of UDCD Stack 1 Connections*

## 7.19 Connecting the Power Box to the System

To connect the power box to the system:

1. Attach the cable from connector X1 in the BAMX1 (BAEX) to the ALIN connector in the CSPCI box (stack 1).
2. From PDPX2 (1), stack 1/2, and PDPX2 (2), stack 3/4, connect one –48-V TALK and one –48-V BULK cable to the relevant –48-V connectors on the lower shelves at the back of each stack. Table 9 and Figure 52 show how to connect the bulk and talk cables from the BAMX to the HiPath 4000 cabinets.

| Stack 1 (CABCCD) | Stack 2 (LTU..4) | Stack 3 (LTU..8) | Stack 4 (LTU..12) |
|---|---|---|---|
| TALK PDPX2 (1) to center -48-V connector | TALK NEW CAB PDPX2 (1) to center -48-V connector | TALK PDPX2 (2) to center -48-V connector | TALK NEW CAB PDPX2 (2) to center -48-V connector |
| BULK PDPX2 (1) to right -48-V connector | BULK NEW CAB PDPX2 (1) to right - 48-V connector | BULK PDPX2 (2) to right -48-V connector | TALK NEW CAB PDPX2 (2) to right - 48-V connector |

*Table 9 List of redundant -48-V connections between BAMX and a HiPath 4000 cabinet*

Refer also to the “Section 7.20, “PSDXE Connection”” for additional information.

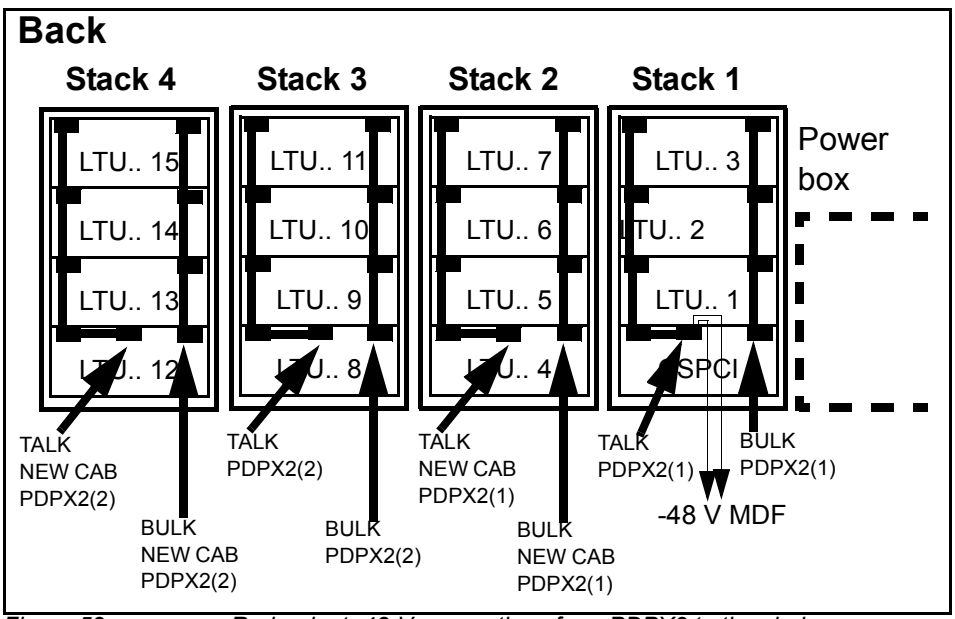



*Figure 52 Redundant -48-V connections from PDPX2 to the shelves*

## 7.19.1 Connecting the MDF for a Redundant System, I.M.

The power supply for the main distribution frame is branched from UACD 1 (–48-V connector unit TALK PDPX2(1)) and connected to the main distribution frame by means of two 1.6-A fuses. (Refer to Figure 53).

The –48 V connectors from the MDFs can be combined as required. Ensure that the number of MDFs connected at a fuse does not exceed the overall power requirement for each 1.6 A fuse.

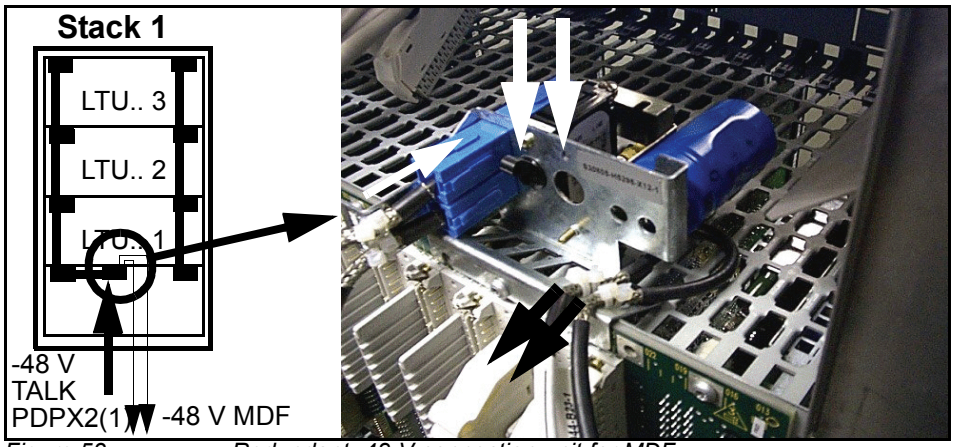



*Figure 53 Redundant -48-V connection unit for MDF*

The main distribution frame connection of –48 V is the same as that described in the Section 7.13.2, “Connecting the MDF for a Nonredundant, System, I.M.”.

## 7.20 PSDXE Connection

Figure 54 shows the connectors in the PSDXE required for connecting the power supply and the battery manager to the system.

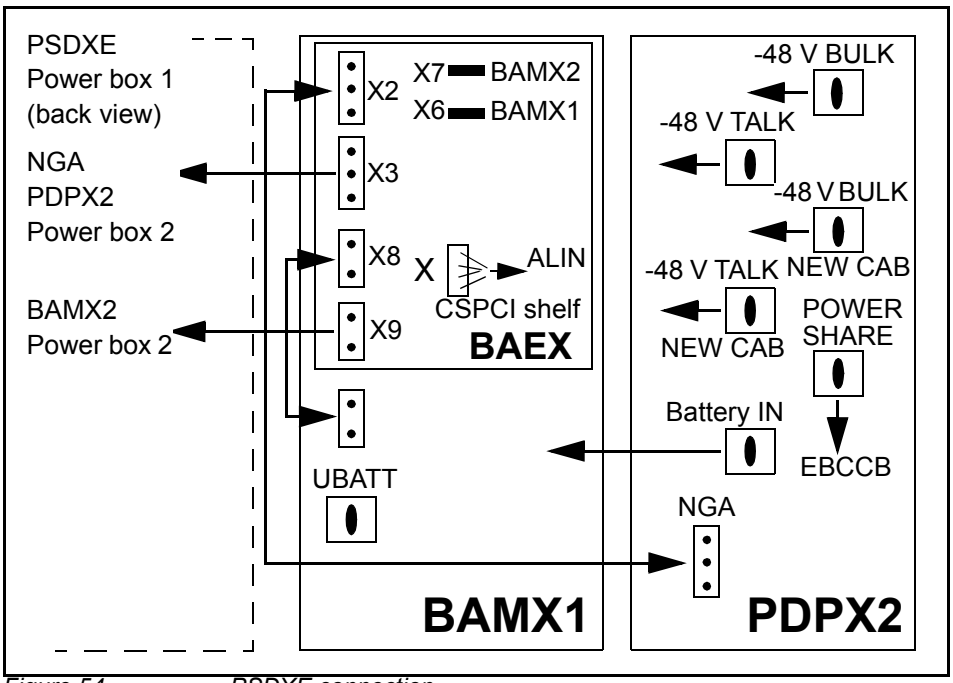



*Figure 54 PSDXE connection*

# 7.21 Calculating the Battery Cabling, I.M.

| battery cable cross section | | | mm² | | | | | | | System power at | Uv |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $16^2$ | $25^2$ | $35^2$ | $50^2$ | **$70^2$** | $95^2$ | 2x$70^2$ | | |
| Stack 1 + Stack 2 | PSU2 | Cable length (m) | 15 | 23 | 32 | 46 | **65** | 84 | 130 | 46 A | 1.5 V |
| | PSU3 | | 10 | 15 | 22 | 31 | **43** | 56 | 86 | 69 A | |
| Stack 3 + Stack 4 | PSU4 | | | | | | | | | 23 A | |
| | PSU5 | | 15 | 23 | 32 | 46 | **65** | 84 | 130 | 46 A | |
| | PSU6 | | 10 | 15 | 22 | 31 | **43** | 56 | 86 | 69 A | |

*Figure 55 Battery cable cross-section*

- Minimum system voltage 42.5 V at the BAEX module (in the BAMX1 in CABPSD)
- Permissible voltage drop (Uv) on the battery cable, from the terminal to the battery, if the battery is to be discharged to 44V (1.83V/battery)
- The system current is based on the power supply units output as follows:
  - Maximum 2 UACDs with up to 6 power supply units (PSUs)
  - For every PSU -->continuous load 23 A
  - Maximum 23 A x n (PSU) (power supplies are in accordance to Figure 56)

---

***NOTE:*** If possible, the battery cable cross-section should not be less than **70 mm²**, even in configurations with fewer than 6 PSUs. A cross-section of at least 70 mm² if the configuration is subsequently expanded to the maximum of 6 PSUs in order to ensure proofing against short-circuits. Expansions should always provide for a certain reserve, as otherwise, the battery cable must be reinforced or replaced if the voltage drop (Uv) is exceeded at 1.5 V.

---

$$\frac{2 \times \#\ (m) \times *\ (qty) \times 23\ (A)}{1.5\ (Uv) \times 58(æ)} = \frac{?}{87} = \underline{\underline{?}}\ mm^2 \text{ per +/ - cable}$$

The formula must be supplemented with two values:

#) = Distance between system & battery
*) = Required number of PSUs

*Figure 56 Formula for calculating battery cable cross-section*

# 8 Internal Line Cables

This chapter provides instructions for installing internal cables on the HiPath 4000 system.

## 8.1 Installing Signal Cables

Signal cables are referred to as LTU signal cables. Signal cables should already be connected when the system is shipped out of the factory. Should the cables become loose or removed during transit, install the signal cables on the HiPath 4000 as follows:

---

***NOTE:*** To avoid a short-circuit, ensure that the power on the system is off before connecting and removing the LTU cables.

---

1. Table 1 contains an overview of the signal cable connections between the LTUCA ports of the LTU/AP3700 expansion cabinets (see Figure 1) and the CSPCI backplane ports on the RTM board (see Figure 2).

   The following default cable lengths are used depending on the installation variant:

   - 2 m (in stack 1)
   - 5 m (from stack 2-4)
   - 5 m or 10 m (if the CSPCI frame is installed in the external 19" frame)

| System Type | From | To |
|---|---|---|
| Mono | LTU.. 1 - LTU.. 15 (LTUCA mod. CCA) | CSPCI RTM MOD. (SLOT 1/2) |
| | | |
| Duplex | LTU.. 1 - LTU.. 15 (LTUCA mod. CCA) | CSPCI RTM MOD. (SLOT 2/3) |
| | LTU.. 1 - LTU.. 15 (LTUCA mod. CCB) | CSPCI RTM MOD. (SLOT 5/6) |

*Table 1 Signal cable connections*

   The cables for trunk failure transfer, reference clock and alarm signaling are connected to the MCM board.

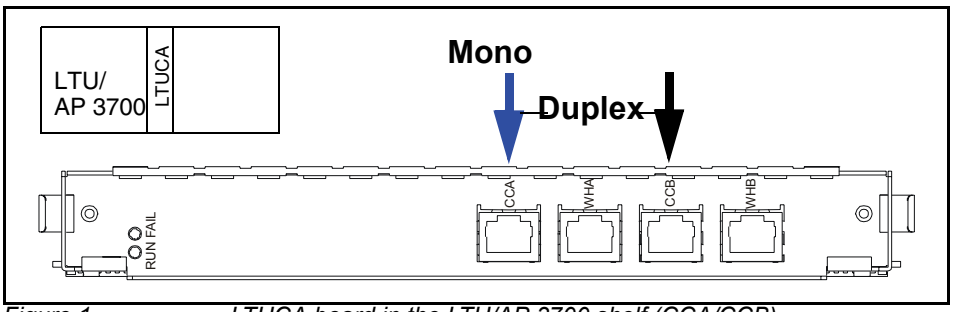



*Figure 1 LTUCA board in the LTU/AP 3700 shelf (CCA/CCB)*

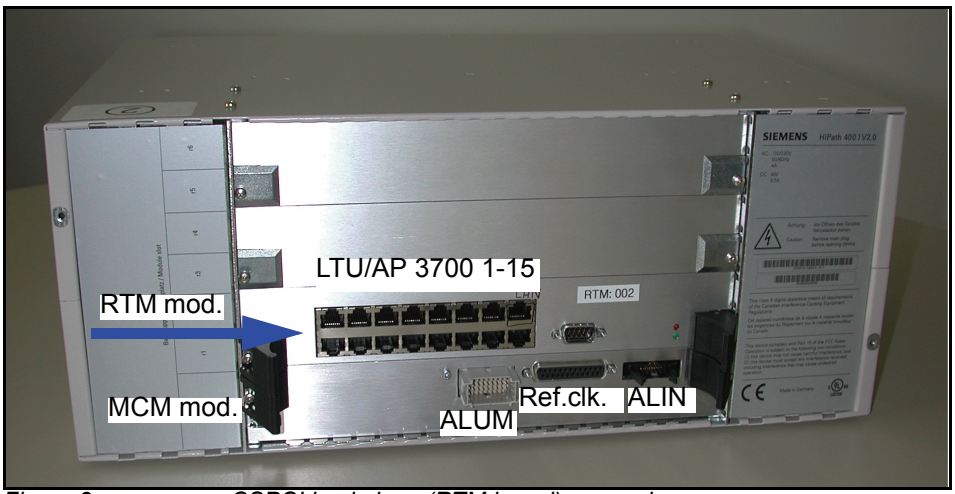
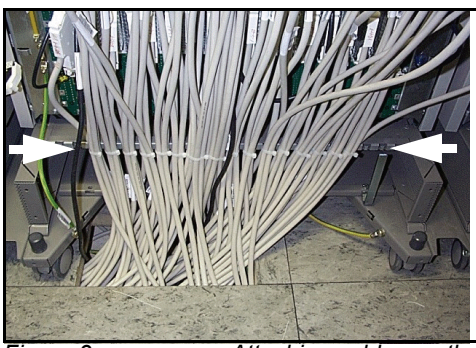



*Figure 2 CSPCI backplane (RTM board), example mono*

2. All cables that lead to the main distribution frames (I.M.) must be attached to the relevant stack frames with cable fasteners (see Figure 3).



This figure shows the cable attachment points on the stack.

*Figure 3 Attaching cables on the HiPath 4000*

## 8.1.1 Overview of CSPCI (RTM Board) Connection to L80XF/LTUW/AP 3700 (LTUCA Board)

| **C39195-Z7211-A...** | **20** | **20** | **20** | **50** | **50** | **50** | **50** | **50** | **50** | **50** | **50** | **50** | **50** | **50** | **50** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |
| **L80XF/ LTUW/ AP3700** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| Front LTUCA mod. | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA | CCA |
| **CSPCI** |  | | | | | | | | | | | | | | |
| Cab. connector | LTU 1 | LTU 2 | LTU 3 | LTU 4 | LTU 5 | LTU 6 | LTU 7 | LTU 8 | LTU 9 | LTU 10 | LTU 11 | LTU 12 | LTU 13 | LTU 14 | LTU 15 |
| SLOT, rear 1st RTM, mono or 1st RTM, duplex 2nd RTM, duplex | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 | R1/2 or R2/3 R5/6 |
| Cab. connector | LTU 1 | LTU 2 | LTU 3 | LTU 4 | LTU 5 | LTU 6 | LTU 7 | LTU 8 | LTU 9 | LTU 10 | LTU 11 | LTU 12 | LTU 13 | LTU 14 | LTU 15 |
| |  | | | | | | | | | | | | | | |
| Front LTUCA mod. | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB | CCB |
| **L80XF/ LTUW/ AP3700** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |

*Table 2* *Overview of CSPCI (RTM board) connection to L80XF/LTUW/AP 3700 (LTUCA board)*

## 8.1.2 Overview of CSPCI Periphery Connections

| | | **1)** | Service | Adapt. f. Modem/ Terminal | **2)** | LTUCA/ Periph. | | | UACD Box | MDF **3) / 4)** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Front cable | Front cable | Front cable | Front cable | Rear | Rear | Rear | Rear | Rear |
| **CSPCI** | **SLOT > Mod.** | **1 / 2 / 5 -----DSCXL-----** | | | **6 SF2X8** | **RTM** | | **----MCM----** | | |
| KAST name | | LAN 8-8pos | V24 9-9pos | V24 9-24pos | LAN 8-8pos | LAN[5] 8-8pos | V24 9-24pos | ref.clock 25-25pos | ALIN 10-10pos | ASW 1SU-open |
| C39195-Z7211-A.. | | 7...120 | | | 7...120 | 20...100 | | | | |
| S30267-Z355-A.. | | | 25 | | | | 25 | | | |
| C39195-Z7602-A.. | | | | 30/100 | | | | | | |
| S30267-Z19-A.. | | | | 30 | | | | | | |
| S30267-Z317-A..[3)] | | | | | | | | | | 50...950 |
| S30267-Z358-A..[4)] | | | | | | | | | | 50...200 |
| S30267-Z304-A.. | | | | | | | | 9 | | |

*Table 3 Overview of CSPCI periphery connections*

**1)** LAN 8 pos (connector/connector)

- f. customer
- f. service
- f. IPDA
- f. Atlantik

**2)** LAN 8 pos (connector/connector)

- f. 8x customer
- f. 2x service

**3)** Cable for ASW (alarm signaling), Ger/I.M.

**4)** Cable for ASW (alarm signaling), U.S.

**5)** 15 LAN cable for LTU1...LTU15 (AP3700 --> 1 ... 15), see also label on RTM panel (cable lengths: 2m, 5m, 10m)

## 8.2 Installing the Service Alarm Cable and Trunk Bypass

To install the service alarm cable and trunk bypass on the HiPath 4000:

The connectors for the alarm interface and trunk failure transfer are located on the MCM board in the CSPCI frame (rear).

1. Connect the cable for trunk bypass (S30267-Z317-A*) to the 1SU connector (ALUM) on the MCM board
2. Terminate this open-end cable properly at the MDF.
3. Connect the cable for the alarm interface (C39195-Z7904-A25) to the ALIN connector on the MCM board and connect the other end of the cable to the ALIN connector on the UACD cabinet (see also Figure 2).

# 9 External Cabling Assemblies

This chapter provides installation and cabling diagrams for the HiPath 4000 system. Diagrams for the IPDA are located in the associated chapter. Unless otherwise noted, all diagrams apply to both U.S. and I.M. installations.

This section describes the assembly of the main distribution frames and the cables that must be connected from the MDF splitting strips to the corresponding LTU/AP 3700 slots in the HiPath 4000 (also refer to the cable plugging list that accompanies the relevant system). Two different MDFs can be used (MDFHX6/ MDFHX 8) depending on the system configuration.

---

***NOTE:*** In new installations, always connect shielding wires. Do not modify existing shielding wires if a main distribution frame is already being used. Do not use shielding wires for ground distribution. Use the YV 2x0.5/0.9 jumper wires for jumpering.

---

## 9.1 MDFHX6 Assembly, I.M.

**A01:**
**Carrier for special modules** (ALUM relay, automatic cutout etc.)

**B/F:**
**Plate** (attachment for internal and external ground cable)

**C01-C16:**
**24 DA splitting strips** (internal connections for system LTUE network)

**D001-D19:**
**35 DA strapping connectors** (external connections for server, AC, line and CO network)

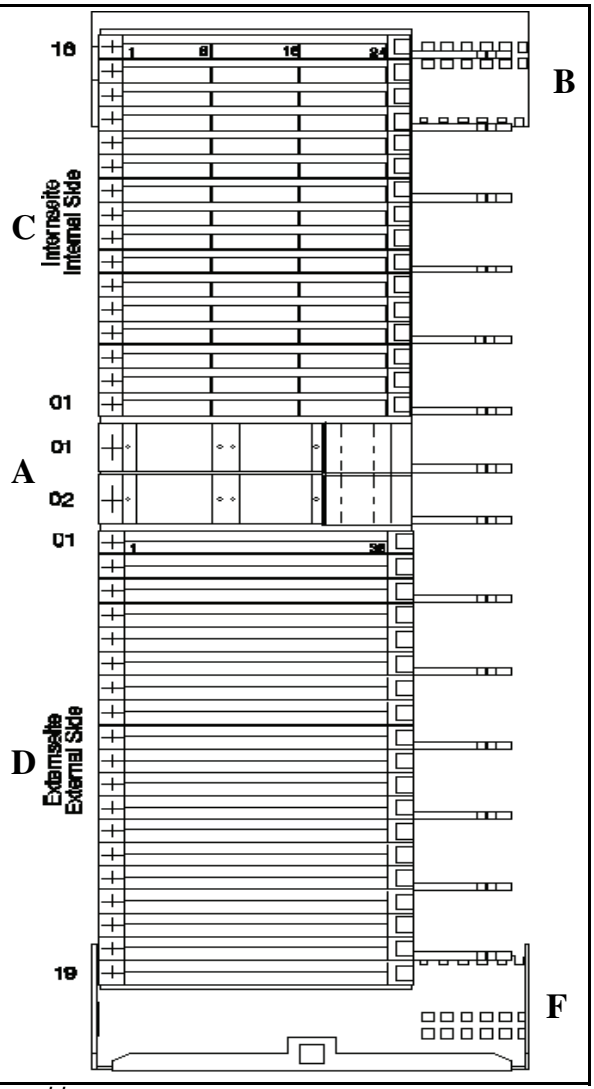



*Figure 1 MDFHX6 assembly*

## 9.1.1 Cabling from the LTU to the MDF, I.M.

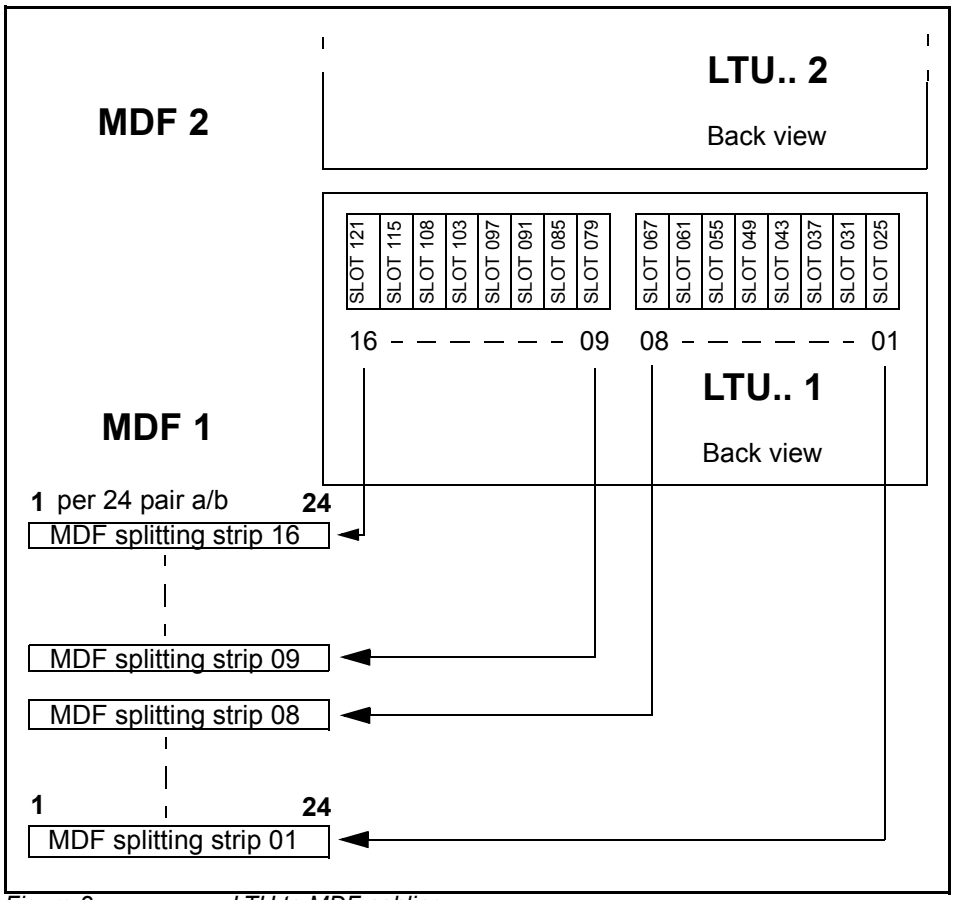



*Figure 2 LTU to MDF cabling*

## 9.1.2 Cable Routing from AP 3700-13 Cabinet to the MDF, I.M.

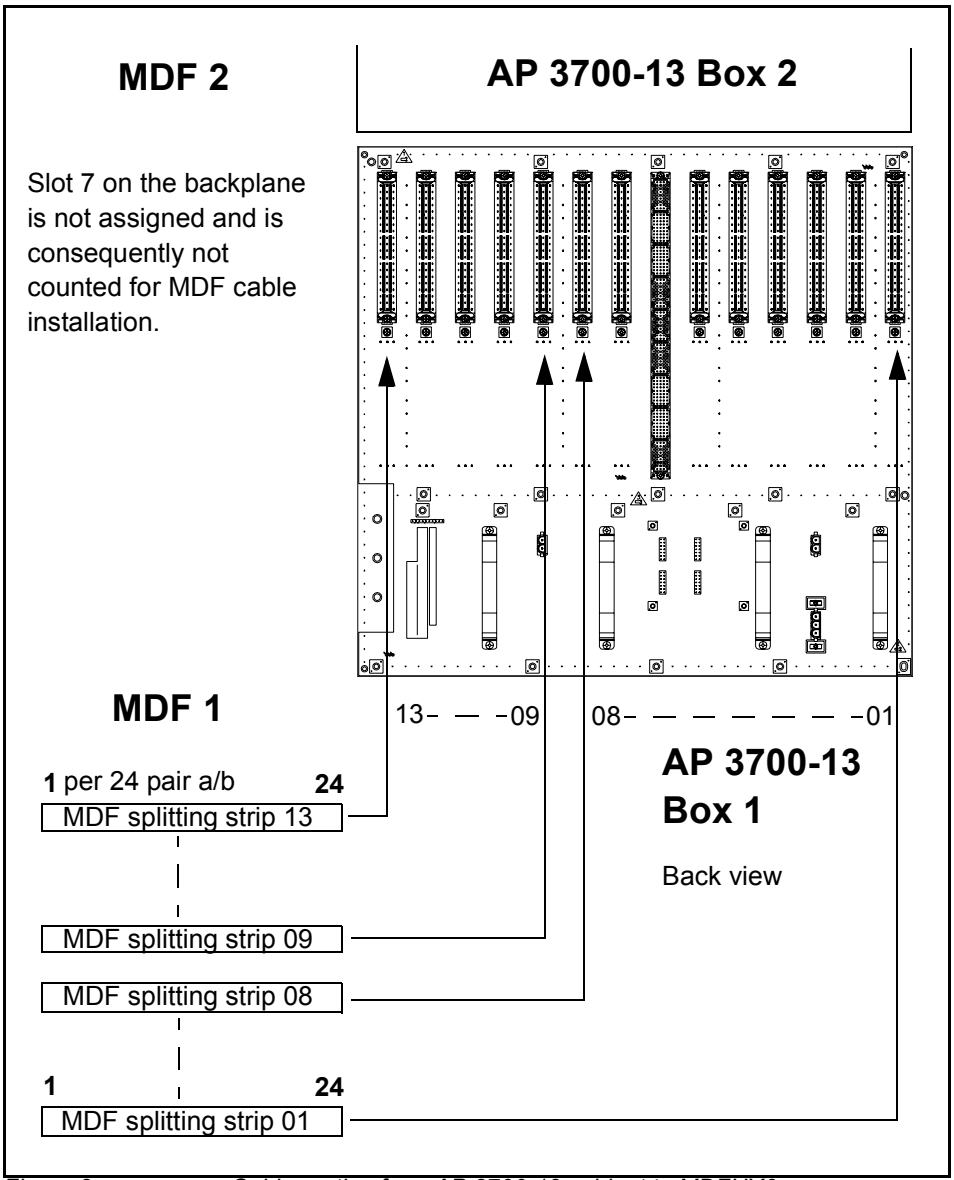



*Figure 3 Cable routing from AP 3700-13 cabinet to MDFHX6*

## 9.2 MDFHX8 Assembly, I.M.

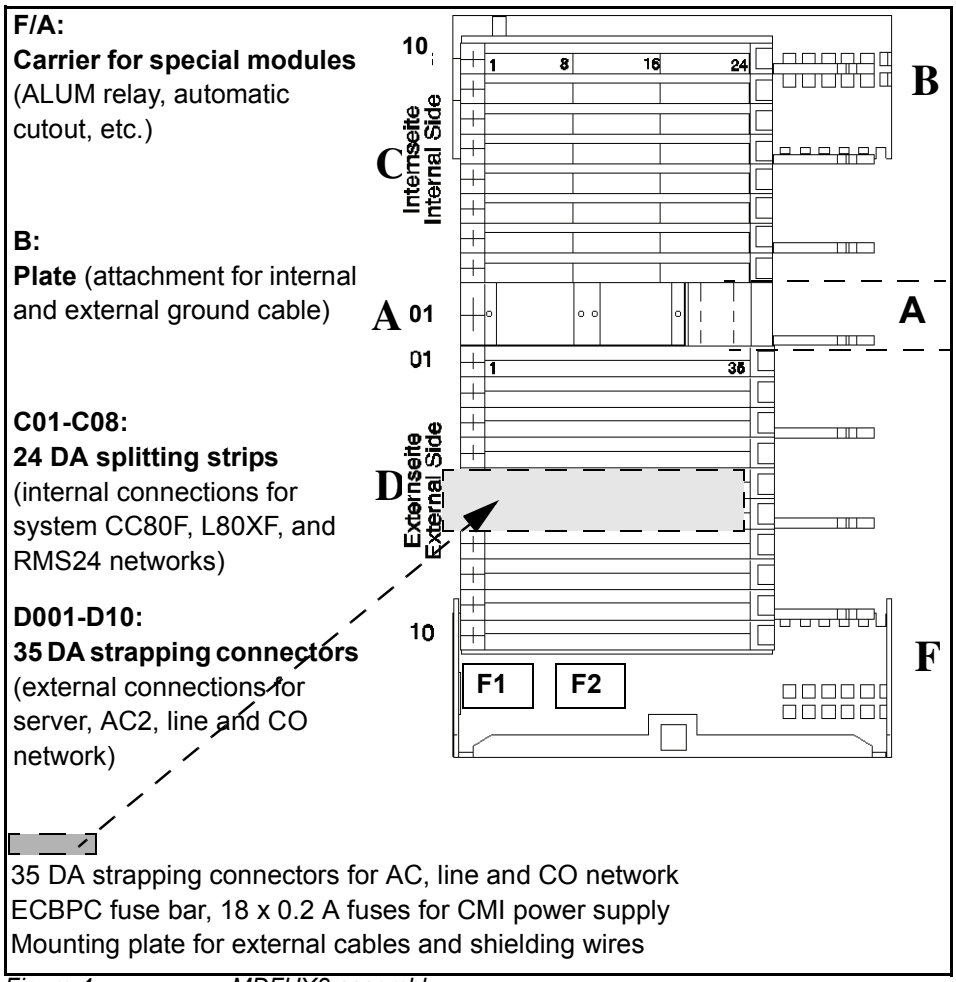



*Figure 4 MDFHX8 assembly*

## 9.2.1 Cabling from the LTU to the MDF, I.M.

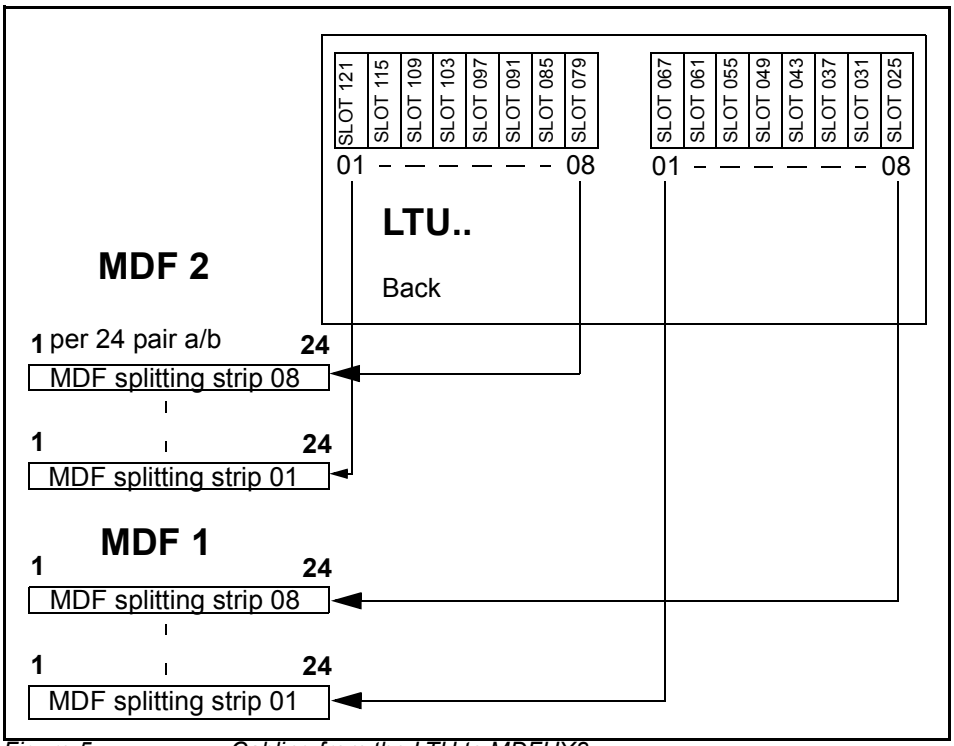



*Figure 5 Cabling from the LTU to MDFHX8*

## 9.2.2 Cable Routing from AP 3700-13 Cabinet to the MDF, I.M.

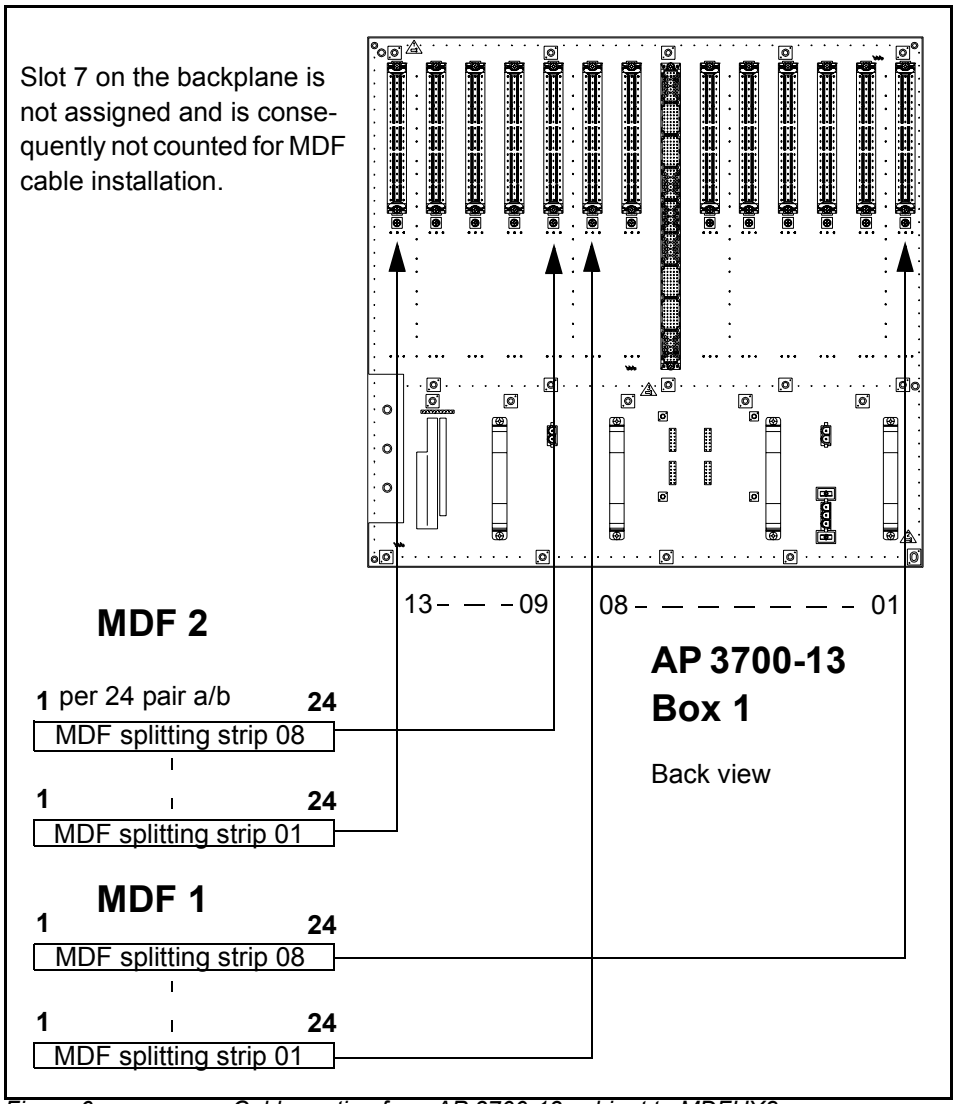



*Figure 6 Cable routing from AP 3700-13 cabinet to MDFHX8*

## 9.3 Overvoltage Protection of the Modules, I.M.

Overvoltage protection is integrated in the module for 24DA cables. The cable connectors do not contain any other overvoltage protection devices.

Where necessary, you can use overvoltage protectors to protect external cables to the main distribution frame against atmospheric pressure.

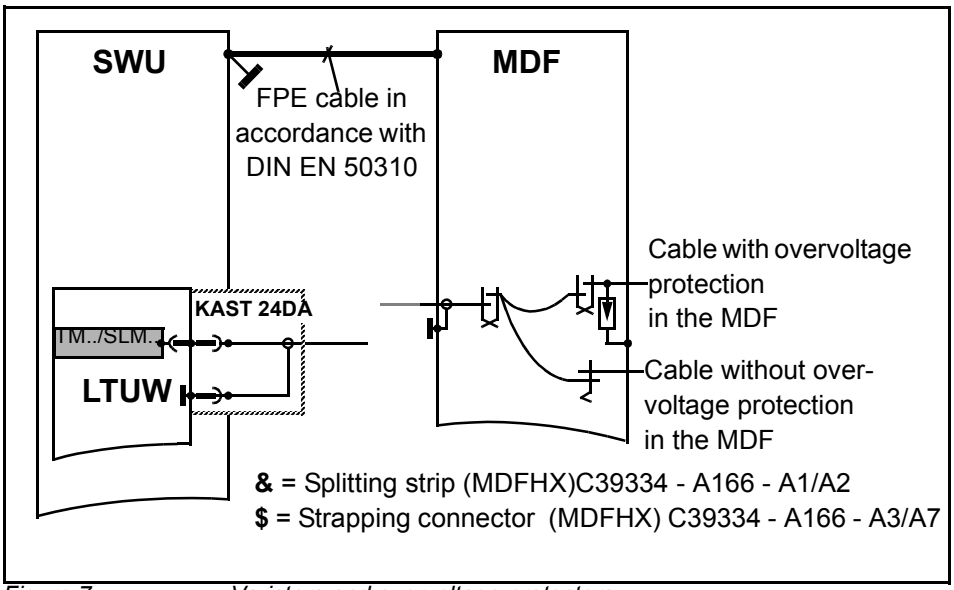



*Figure 7 Varistors and overvoltage protectors*

## 9.4 MDF Cable Connections, I.M.

***IMPORTANT:*** PIN assignment is different on the LTUW backplane and the cable connectors!

| Connect. Pin | | Cable | | Connect. Pin | | Cable | | Connect. Pin | | Cable | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mod** | **Cab Pin** | **Wire** | **Cable Color** Wire Ring | **Mod** | **Cab Pin** | **Wire** | **Cable Color** Wire Ring | **Mod** | **Cab Pin** | **Wire** | **Cable Color** Wire Ring |
| 1 | 20 | 1a | White--Blue | 17 | 4 | 9a | Red--Brown | 43 | 58 | 17a | Yellow--Orange |
| 23 | 38 | 1b | Blue--White | 18 | 3 | 9b | Brown--Red | 44 | 57 | 17b | Orange--Yellow |
| 3 | 18 | 2a | White--Orange | 19 | 2 | 10a | Red--Gray | 45 | 56 | 18a | Yellow--Green |
| 4 | 17 | 2b | Orange--White | 20 | 1 | 10b | Gray--Red | 46 | 55 | 18b | Green--Yellow |
| 5 | 16 | 3a | White--Green | 24 | 37 | 11a | Black--Blue | 47 | 54 | 19a | Yellow--Brown |
| 6 | 15 | 3b | Green--White | 25 | 36 | 11b | Blue--Black | 48 | 53 | 19b | Brown--Yellow |
| 7 | 14 | 4a | White--Brown | 26 | 35 | 12a | Black--Orange | 49 | 52 | 20a | Yellow--Gray |
| 8 | 13 | 4b | Brown--White | 27 | 34 | 12b | Orange--Black | 50 | 51 | 20b | Gray--Yellow |
| 9 | 12 | 5a | White--Gray | 29 | 32 | 13a | Black--Green | 51 | 50 | 21a | Violet--Blue |
| 10 | 11 | 5b | Gray--White | 30 | 31 | 13b | Green--Black | 52 | 49 | 21b | Blue--Violet |
| 11 | 10 | 6a | Red--Blue | 31 | 30 | 14a | Black--Brown | 53 | 48 | 22a | Violet--Orange |
| 12 | 9 | 6b | Blue--Red | 32 | 29 | 14b | Brown--Black | 54 | 47 | 22b | Orange--Violet |
| 13 | 8 | 7a | Red--Orange | 34 | 27 | 15a | Black--Gray | 55 | 46 | 23a | Violet--Green |
| 14 | 7 | 7b | Orange--Red | 35 | 26 | 15b | Gray--Black | 56 | 45 | 23b | Green--Violet |
| 15 | 6 | 8a | Red--Green | 37 | 24 | 16a | Yellow--Blue | 57 | 44 | 24a | Violet--Brown |
| 16 | 5 | 8b | Green--Red | 38 | 23 | 16b | Blue--Yellow | 58 | 43 | 24b | Brown--Violet |

*Table 1 MDF 16DA/24DA cabling*

# 9.5 Connecting the Signal or Alarm Cables to the MDF, I.M.

Connect the signal or alarm cable to the MCM board (ALUM connector) and to the main distribution frame on splitting strip D1 (only on MDF1). For D1 splitting strip, see Figure 1).

**ALUM (trunk failure transfer)**

The following three signals from the DSCXL module are routed via this interface:

- ALUM (trunk failure transfer), max. 1A/30W
- NAL (Not urgent Alarm)
- UAL (Urgent Alarm)

These signals are transmitted via relays to the front connector (15-pin), which is connected in turn to the main distribution frame via the cable C39195-Z7612-A* (DSub connector, open end).

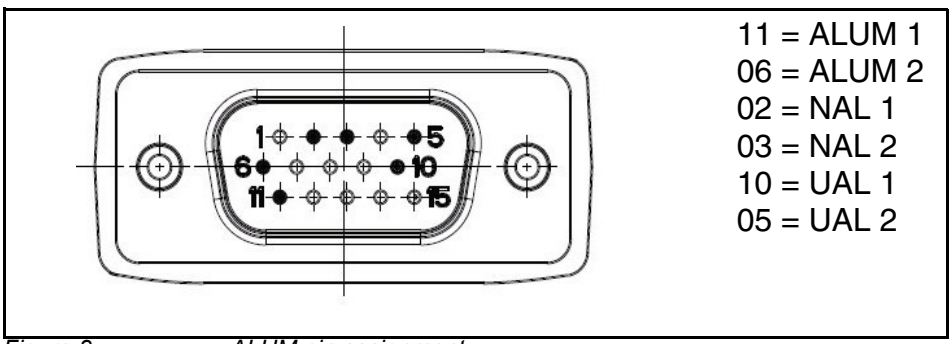



*Figure 8 ALUM pin assignment*

**ALUM cable types**

| Part number | Type | Cable length |
|---|---|---|
| C39195-Z7612-A100 | ASW cable to MDF | 10m |
| C39195-Z7612-A200 | ASW cable to MDF | 20m |
| C39195-Z7612-A550 | ASW cable to MDF | 55m |
| C39195-Z7612-A950 | ASW cable to MDF | 90m |
| C39195-Z7613-A50 | ASW cable to patch panel (release for IM) | 5m |
| C39195-Z7614-A100 | ASW cable to MDF | 10m |
| C39195-Z7614-A150 | ASW cable to MDF | 15m |

*Table 2 ALUM cable types*

## 9.6 Connecting Subscriber Line Modules/Trunk Boards

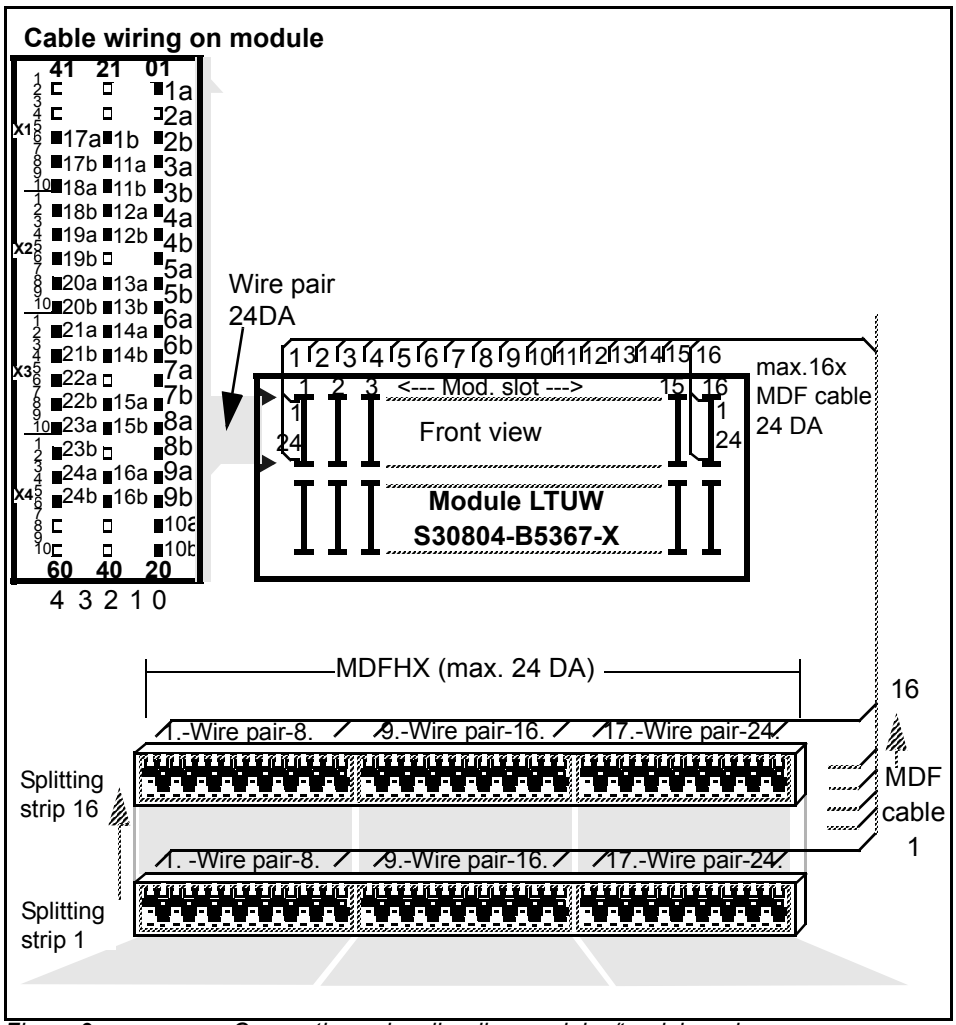



*Figure 9 Connecting subscriber line modules/trunk boards*

## 9.6.1 Subscriber-Line Module Boards

| **Part No. S30810-** | **Board** Abbreviation | **Remarks** |
|---|---|---|
| -Q6194-X | SLCSM | |
| -Q2153-X | SLMQ | |
| -Q2153-X100 | SLMQ | |
| -Q2141-X | SLMA | |
| -Q2191-X | SLMA3 | |
| -Q2246-X | SLMA | |
| Q2191-C | SLMAC | |
| Q2225-X | SLMAE | |
| -Q2193-X100 | SLC24 | Symmetrical signaling lines |
| -Q2193-X200 | SLC24 | Asymmetrical signaling lines |
| -Q2479-X | SLMQ3 | |
| -Q2160-X | STMA | OWG-multimode |
| -Q2160-X100 | STMA | OWG-singlemode |
| -Q2163-X | STMD2 | |
| -Q2163-X100 | STMD2 | |
| -Q2168-X | SLMO2 | |
| -Q2174-X | STMD | |
| -Q2177-X | STHC | |
| -Q2184-X | SLMAB | |
| -Q2169-X100 | SLMOP | |
| -Q2480-X | SLMAR | |
| -Q2809-X100 | SLMT | Project-specific |
| -Q2816-X | SLMY | |
| -Q2324-500X | STMI4 | |
| -Q2324-510X | STMI4 | |
| -Q2815-X | STMVI | |

*Table 3 Subscriber line modules and part numbers*

### 9.6.1.1 Connecting the Subscriber Line Modules

Table 4 lists the line connections for the subscriber line modules.

| ..... Subscriber Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** | | | | **Range Damping** | | | | | **Type of Operation Remarks** | | | | | | | | **per Mod.** | **a/b PE Circuit** |
| | | | | | DTMF | DP | Prop Dig. | ISDN | | | | | | | | | | | | | | | |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *SLC24* **-Q2193-X** | | | | | | | | **X** **X** | **1 km** For local feed; dependent on cable type | | | | | **LT - digital** **4 x B (48 Kbps) + D (24 Kbps)** | | | | | | | **$U_{P0/E}$** | **24** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | 17 --- a b | 18 --- a b | 19 --- a b | 20 --- a b | 21 --- a b | 22 --- a b | 23 --- a b | 24 --- a b |
| *SLMA* **-Q2141-X** | | | **001XH** | | **X** | **X** | | | **2 x 750 Ohm** **0 dB ± 0.3 dB** **7 dB ± 0.3 dB** | | | | | **TS - analog** **Dual SICOFI** **for DP and DTMF terminals** | | | | | | | | **16** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | | | | | | | | |
| *SLMAR* **-Q2480-X** | | | **EB0XH** | | **X** | **X** | | | **2 x 600 Ohm** **3 dB ± 0.3 dB** (FRG) **-10 dB ± 0.3 dB** (FRG) | | | | | **TS - analog** **Quad- SICOFI** **for DP and DTMF terminals** | | | | | | | | **8** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | | | | | | | | | | | | | | | | |
| *SLMA2* **-Q2246-X** | | | **EC0XH** | | **X** | **X** | | | **2 x 600 Ohm** **3 dB ± 0.3 dB** (FRG) **-10 dB ± 0.3 dB** (FRG) | | | | | **TS - analog** **Quad- SICOFI** **for DP and DTMF terminals** | | | | | | | | **24** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | 17 --- a b | 18 --- a b | 19 --- a b | 20 --- a b | 21 --- a b | 22 --- a b | 23 --- a b | 24 --- a b |

*Table 4 Subscriber line module connections (page 1 of 3)*

| ..... Subscriber Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** | | | | **Range Damping** | | | | | **Type of Operation Remarks** | | | | | | | | | **per Mod.** | **a/b PE Circuit** |
| | | | | | DTMF | DP | Prop Dig. | ISDN | | | | | | | | | | | | | | | | |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *SLMOP* **-Q2180-X** | | | **009XH** | | | | **X** | **X** | **1 km** For local feed; dependent on cable resistance | | | | | **TS - digital** **2 x B (64 Kbps) + D (16 Kbps)** | | | | | | | | **$U_{P0/E}$** | **24** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | 17 --- a b | 18 --- a b | 19 --- a b | 20 --- a b | 21 --- a b | 22 --- a b | 23 --- a b | 24 --- a b |
| *SLMO2* **-Q2168-X** | | | **80FXH** | | | | **X** | **X** | **1 km** For local feed; dependent on cable resistance | | | | | **TS - digital** **2 x B (64 Kbps) + D (16 Kbps)** | | | | | | | | **$U_{P0/E}$** | **24** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | 17 --- a b | 18 --- a b | 19 --- a b | 20 --- a b | 21 --- a b | 22 --- a b | 23 --- a b | 24 --- a b |
| *SLMQ* **-Q2133-X** | | | **078XH** | | | | | **X** | **5.5 ... 9 km** For local feed; dependent on cable resistance | | | | | **TS - digital or NT PABX or 2 x B (64 Kbps) LT-+NT operation + D (16 Kbps)** | | | | | | | | **2B1Q-$U_{k0}$** | **16** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | | | | | | | | |
| *SLMQ* **-Q2153-X - X100** | | | **07AXH** **07CXH** | | | | **X** **X** | **X** **X** | **5.5 ... 9 km** For local feed; dependent on cable resistance | | | | | **LT - digital or LT-+NT operation 2 x B (64 Kbps) + D (64 Kbps)** | | | | | | | | **2B1Q-$U_{k0}$** | **16** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 9 --- a b | 10 --- a b | 11 --- a b | 12 --- a b | 13 --- a b | 14 --- a b | 15 --- a b | 16 --- a b | | | | | | | | |

*Table 4 Subscriber line module connections (page 2 of 3)*

| ..... Subscriber Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** DTMF | DP | Prop Dig. | ISDN | **Range Damping** | | | | | **Type of Operation Remarks** | | | | | | | | **per Mod.** | **a/b PE Circuit** |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *STMD* **-Q2174-X** | | | **077XH** | | | | | **X** | **1000 m (to NT)** | | | | | **TS/AS - digital 2 x B (64 Kbps) + D (16 Kbps)** R=receive, T=transmit | | | | | | | **ISDN, $S_0$** | **8** | **2** |
| 1 --- a0 b0 S0 R | 1 --- a1 b1 S0 T | 2 --- a2 b2 S0 R | 2 --- a3 b3 S0 T | 3 --- a4 b4 S0 R | 3 --- a5 b5 S0 T | 4 --- a6 b6 S0 R | 4 --- a7 b7 S0 T | 5 --- a8 b8 S0 R | 5 --- a9 b9 S0 T | 6 --- a10 b10 S0 R | 6 --- a11 b11 S0 T | 7 --- a12 b12 S0 R | 7 --- a13 b13 S0 T | 8 --- a14 b14 S0 R | 8 --- a15 b15 S0 T | | | | | | | | |
| *STHC* **-Q2177-X** | | | **375XH** | | | | | **X** | **1000 m (extended bus 500 m short bus 150 m in subscriber mode)** | | | | | **TS/AS - digital 2 x B (64 Kbps) + D (16 Kbps)** R=receive, T=transmit | | | | | | | **$U_{P0/E}$ $S_0$** | **16 4** | **1 2** |
| 1 --- a0 b0 | 2 --- a1 b1 | 3 --- a2 b2 | 4 --- a3 b3 | 5 --- a4 b4 | 6 --- a5 b5 | 7 --- a6 b6 | 8 --- a7 b7 | 9 --- a8 b8 | 10 --- a9 b9 | 11 --- a10 b10 | 12 --- a11 b11 | 13 --- a12 b12 | 14 --- a13 b13 | 15 --- a14 b14 | 16 --- a15 b15 | 17 --- a16 b16 S0 R | 17 --- a17 b17 S0 T | 18 --- a18 b18 S0 R | 18 --- a19 b19 S0 T | 19 --- a20 b20 S0 R | 19 --- a21 b21 S0 T | 20 --- a22 b22 S0 R | 20 --- a23 b23 S0 T |
| *STMD2* **-Q2163-X - X100** | | | **075XH 074XH** | | | | | **X** | **1000 m (to NT)** | | | | | **TS/AS - digital 2 x B (64 Kbps) + D (16 Kbps)** R=receive, T=transmit | | | | | | | **ISDN, $S_0$** | **8** | **2** |
| 1 --- a0 b0 S0 R | 1 --- a1 b1 S0 T | 2 --- a2 b2 S0 R | 2 --- a3 b3 S0 T | 3 --- a4 b4 S0 R | 3 --- a5 b5 S0 T | 4 --- a6 b6 S0 R | 4 --- a7 b7 S0 T | 5 --- a8 b8 S0 R | 5 --- a9 b9 S0 T | 6 --- a10 b10 S0 R | 6 --- a11 b11 S0 T | 7 --- a12 b12 S0 R | 7 --- a13 b13 S0 T | 8 --- a14 b14 S0 R | 8 --- a15 b15 S0 T | | | | | | | | |

*Table 4 Subscriber line module connections (page 3 of 3)*

## 9.6.2 Trunk Module Part Numbers

| **Part No. S30810-** | **Board** Abbreviation | **Remarks** |
|---|---|---|
| Q2226-X200 | DIUT2 | |
| Q2327-X100 | TMANI | |
| Q2197-T | TMDID | |
| -Q2012-X100 | TMEM | |
| -Q2064-X100 | TMLR | |
| -Q2123-X | TMLBL | |
| -Q2123-X100 | TMLBL | |
| -Q2147-X | TMSFP | |
| -Q2147-X300 | TMSFP | |
| -Q2147-X400 | TMSFP | |
| -Q2159-X100 | TM2LP | |
| -Q2159-X110 | TM2LP | |
| -Q2159-X120 | TM2LP | |
| -Q2159-X130 | TM2LP | |
| -Q2159-X140 | TM2LP | |
| -Q2159-X150 | TM2LP | |
| -Q2159-X160 | TM2LP | |
| -Q2159-X170 | TM2LP | |
| -Q2159-X180 | TM2LP | |
| -Q2159-X190 | TM2LP | |
| -Q2452-X | TMDID | |
| -Q2286-X | TMLRB | |
| -Q2186-X100 | TMLRB | |
| -Q2216-X | DIU2U | |
| -Q2214-X100 | TMOM2 | |
| -Q2288-X | TMCOW | |
| -Q2288-X10 | TMCOW | |
| -Q2288-X20 | TMCOW | |
| -Q2288-X40 | TMCOW | |
| -Q2288-X50 | TMCOW | |
| -Q2288-X60 | TMCOW | |
| -Q2288-X100 | TMCOW | |
| -Q2288-X120 | TMCOW | |
| -Q2288-X130 | TMCOW | |

*Table 5 Subscriber line modules and part numbers*

| **Part No.**<br>**S30810-** | **Board**<br>Abbreviation | **Remarks** |
|---|---|---|
| -Q2288-X310 | TMCOW | |
| -Q2292-X100 | TMEW2 | |
| -Q2476-X | TM3WO | |
| -Q2477-X | TM3WI | |
| -Q2469-X | TMEMUS | |
| -Q2485-X | TMC16 | |

*Table 5 Subscriber line modules and part numbers*

### 9.6.2.1 Connecting the Trunk Modules to the MDF

Table 6 lists the trunk module connections to the MDF.

| ..... Trunk Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** DTMF or MFC | DP 1.6:1 | DP 2:1 | 2.WT | **Range Damping** *lL = Long cable kL = Short cable* | | | | | **Type of Operation Remarks** | | | | | | | | **per mod.** | **a/b per Circuit** |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *TMEM* **-Q2012-X100** | | | **021XH** | | | **X** | | | **2 x 1000 Ohm -3.5/-3.5 dBr** | | | | | **Tie-line circuit with E&M, CF code and WTK1** | | | | | | | | **4** | **3** |
| 1 --- ka kb | 2 --- ka kb | 3 --- ka kb | 4 --- ka kb | 1 --- ga gb | 2 --- ga gb | 3 --- ga gb | 4 --- ga gb | 1 --- EM | 2 --- EM | 3 --- EM | 4 --- EM | - --- | - --- | - --- | - --- | | | | | | | | |
| TMEW2 **-Q2292-X100** | | | **029XH** | | **DTMF** | **X** | **X** | **X** | **2 x 1000 Ohm** | | | | | **Tie-line circuit with E&M and CF code SICOFI With strap option <u>Assignment:</u>** | | | | | | | | **4** | **4** |
| 1 --- AE BE --- T R --- Fan A B --- T R | 2 --- AE BE --- T R --- Fan A B --- T R | 3 --- AE BE --- T R --- Fan A B --- T R | 4 --- AE BE --- T R --- Fan A B --- T R | 1 --- AM BM --- T1 R1 --- Fab A B --- T1 R1 | 2 --- AM BM --- T1 R1 --- Fab A B --- T1 R1 | 3 --- AM BM --- T1 R1 --- Fab A B --- T1 R1 | 4 --- AM BM --- T1 R1 --- Fab A B --- T1 R1 | 1 --- E M --- E M --- - San Sab --- E SG | 2 --- E M --- E M --- - San Sab --- E SG | 3 --- E M --- E M --- - San Sab --- E SG | 4 --- E M --- E M --- - San Sab --- E SG | 1 --- MA MB --- - - --- - - --- M SB | 2 --- MA MB --- - - --- - - --- M SB | 3 --- MA MB --- - - --- M SB | 4 --- MA MB --- - - --- M SB | - ---------- <-- Standard ---------- <-- Type I ---------- <-- Type Ia - ---------- <-- Type II | | | | | | | | | | | | | | | | | | | | | | | | |

*Table 6 Connection to MDF (page 1 of 3)*

| ..... Trunk Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** DTMF or MFC | DP 1.6:1 | DP 2:1 | 2.WT | **Range Damping** *lL = Long cable* *kL = Short cable* | | | | | **Type of Operation Remarks** | | | | | | | | | **per mod.** | **a/b per Circuit** |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *TMLBL* **-Q2123-X** **-** **X100** | | | **43AXH** **436XH** | | DTMF | | | | **2 x 9 KOhm -7/-0 dB** *lL:* **-0/-7 dB** *kL:* **-5/-2 dB -7/-0 dB** | | | | | **Local battery bi-directional COFI No direct inward dialing (DID)** | | | | | | | | | **8** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | | | | | | | | | | | | | | | | |
| *TMLR* **-Q2064- X100** | | | **0A5XH** | | DTMF | **X** | | | **2 x 1000 Ohm depending on remote system;** | | | | | **Tie-line circuit - direct current loop Bi-directional SICOFI** | | | | | | | | | **2** | **1** |
| 1 --- a b | - --- | 2 --- a b | - --- | | | | | | | | | | | | | | | | | | | | |
| *TMOM2* **-Q2214-** **X100** | | | **051XH** | | DTMF | **X** | | | **a/b > 17 mA max. 2 x 500 / 1000 Ohm (depending on partner) c-wire max. 200Ohm (with 3-wire connection) -0/-7 dBr** | | | | | **APSE QUAD-SICOFI (adapter for special equipment) Paging equipment, dictation equipment, TERM, ELA, NWS, announcement equipment, QU, and outgoing loop monitoring** | | | | | | | | | **4** | **3** |
| 1 --- a b | 3 --- a b | 2 --- a b | 4 --- a b | 1 --- JP | 1 --- DC | 2 --- JP | 2 --- DC | 3 --- JP | 3 --- DC | 4 --- JP | 4 --- DC | | | | | | | | | | | | |

*Table 6 Connection to MDF (page 2 of 3)*

| ..... Trunk Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** | | | | **Range Damping** *lL = Long cable kL = Short cable* | | | | | **Type of Operation Remarks** | | | | | | | | | **per mod.** | **a/b per Circuit** |
| | | | | | DTMF or MFC | DP 1.6:1 | DP 2:1 | 2.WT | | | | | | | | | | | | | | | | |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *TMSFP* **-Q2147-X - x300 - x400** | | | **43BXH 43EXH 43FXH** | | DTMF | **X** *) | **X** *) | | **-4.0/-4.0 dBr -3.5/-3.5 dBr : -6.0/-1.0 dBr -7.0/-0.0 dBr** | | | | | **Tie-line circuit with DTMF signaling Dual SICOFI 2600 Hz 1200/1600 Hz 2100 Hz 600/750 Hz** *) DTMF signaling | | | | | | | | | | **8** 4Dr | **2** |
| 1 --- Fan AEBE 0 | 1 --- Fab AMBM 0 | 2 --- Fan AEBE 1 | 2 --- Fab AMBM 1 | 3 --- Fan AEBE 2 | 3 --- Fab AMBM 2 | 4 --- Fan AEBE 3 | 4 --- Fab AMBM 3 | 5 --- Fan AEBE 4 | 5 --- Fab AMBM 4 | 6 --- Fan AEBE 5 | 6 --- Fab AMBM 5 | 7 --- Fan AEBE 6 | 7 --- Fab AMBM 6 | 8 --- Fan AEBE 7 | 8 --- Fab AMBM 7 | | | | | | | | |

*Table 6 Connection to MDF (page 3 of 3)*

### 9.6.2.2 Connection to MDF with DID

Table 9-3 lists the trunk connections to the MDF with DID.

| ..... Trunk Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode** DTMF or MFC | DP 1.6:1 | DP 2:1 | 2.WT | **DID** | | **Range Damping** *lL = Long cable kL = Short cable* | | | | **Type of Operation Remarks** | | | | | | | | **per mod.** | **a/b per Circuit** |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *TMLRB* **-Q2286-X** | | | **460XH** | | | | | | **DP, DTMF, MFC R2; Socotel** | | **2 x 1000 Ohm** *lL:* **-8/+2 dBr** *kL:* **-5/-1 dBr** *lL:* **-7.9/-2.9 dBr** *kL:* **-4.9/-5.9 dBr -5/-2 dBr** | | | | **Trunk circuit with DID SICOFI incoming/outgoing feed in CPBX** | | | | | | | **8** | **1.5** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 1 2 --- bu bu | 3 4 --- bu bu | 5 6 --- bu bu | 7 8 --- bu bu | | | | | | | | | | | | |
| *TM3WI* **-Q2477-X** | | | **EEFXH** | | **DTMFC sign** | **X** | **X** | | | | **2 x 1500 Ohm - 3.5/ -1 dBr** | | | | **Trunk circuit with DID SICOFI incoming Loop code and rering evaluation** | | | | | | | **4** | **1** |
| 1 --- a b b1 | 2 --- a b b1 | 3 --- a b b1 | 4 --- a b b1 | | | | | | | | | | | | | | | | | | | | |
| *TM3WO* **-Q2476-X** | | | **EEEXH** | | DTMF MFC sign | **X** | **X** | | | | **2 x 1500 Ohm -3.5/-6 dBr** | | | | **Trunk circuit QUAD-SICOFI Outgoing Local exchange** | | | | | | | **4** 3Dr | **2** |
| 1 --- a b | - --- | 1 --- c | - --- | 2 --- a b | - --- | 2 --- c | - --- | 3 --- a b | - --- | 3 --- c | - --- | 4 --- a b | - --- | 4 --- c | - --- | | | | | | | | |

Table 9-3 Connection to MDF with DID

### 9.6.3.3 Connecting to the MDF with CDR and DID

Table 7 lists the trunk connections to the MDF with CDR and DID.

| ..... Trunk Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Name / Part No. S30810-** | | | **HW ID** | | **Dial Mode for CO** | | | | **CDR** | | | | **DID** | | **Range Damping** *lL = Long cable kL = Short cable* | | | **Type of Operation Remarks** | | | | **per mod.** | **a/b per circuit** |
| | | | | | DTMF or MFC | DP 1.6:1 | DP 2:1 | 2.WT | 50 Hz | 12 kHz | 16 kHz | Sil Rev | | | | | | | | | | | |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *TM2LP* | | | | | | | | | | | | | | | | | | **AS** | | **QSICOFI** | | **8** | **1** |
| **-Q2159-** | | | | | | | | | | | | | | | | | | | | | | | |
| **X100** | | | **480XH** | | | | | | | | | | **DID** | | | | | | | | | | |
| **X110** | | | **481XH** | | | | | | | | | | **DID** | | | | | | | | | | |
| **X120** | | | **482XH** | | **X** | **X** | **X** | **X** | | **X** | | | **DID/** | | | | | | | | | | |
| **X130** | | | **483XH** | | **X** | **X** | **X** | **X** | **X** | | **X** | **X** | **DOD** | | | | | **MSI** | | | | | |
| **X140** | | | **484XH** | | **X** | **X** | **X** | **X** | **X** | | **X** | **X** | | | | | | **MSI** | | | | | |
| **X150** | | | **485XH** | | **X** | **X** | **X** | **X** | **X** | | **X** | **X** | | | | | | **MSI** | | | | | |
| **X160** | | | **486XH** | | **X** | **X** | **X** | **X** | **X** | **X** | | **X** | | | | | | **MSI** | | | | | |
| **X170** | | | **487XH** | | **X** | **X** | **X** | **X** | **X** | | | **X** | | | | | | **MSI** | | | | | |
| **X180** | | | | | | | | | | | | | | | | | | | | | | | |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | 1 2 --- bu bu | 3 4 --- bu bu | 5 6 --- bu bu | 7 8 --- bu bu | | | | | | | | | | | | |

*Table 7 Connection to the MDF with CDR and DID*

### 9.6.3.4 Connecting to the MDF with CDR but without DID

Table 8 lists the trunk connections to the MDF with CDR but without DID.

| ..... Trunk Circuits ..... | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID/ Part No. S30810-** | | | **HW ID** | | **Dial Mode for CO** | | | | **CDR** | | | | **Range Damping** *IL = Long cable kL = Short cable* | | | | **Type of Operation Remarks** | | | | | **per Mod.** | **a/b per Circuit** |
| | | | | | DTMF or MFO | DP 1.6:1 | DP 2:1 | 2.WT | 50 Hz | 12 kHz | 16 kHz | Sil Rev | | | | | | | | | | | |
| MDF cable a/b no., circuit no. per module, wire identification per circuit | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| *TMCOW* | | | | | | | | | | | | | **2x185-530Ohm** (J = 20 mA) | | | | **DUAL-SICOFI Trunk circuit MSI Without DID** | | | | | **8** | **1** |
| **-Q2288-X** | | | **450XH** | | X | **X** | | | | | **X** | **X** | *kL:* **-5/-2 dB** | | | | | | | | | | |
| | | | | | | | | | | | | | *IL*: **-7/0 dB** | | | | | | | | | | |
| | **-X10** | | **451XH** | | X | **X** | | **X** | | | **X** | **X** | *IL*: **-6/-1 dB** | | | | **Incoming and** | | | | | | |
| | **-X20** | | **452XH** | | X | **X** | | **X** | | | **X** | **X** | *kL:* **-4/-3 dB** | | | | **Outgoing** | | | | | | |
| | **-X40** | | **454XH** | | X | **X** | | | | | **X** | **X** | ④ **-3/-4 dB** | | | | **Loop start** | | | | | | |
| | | | | | | | | | | | | | ④ **-4/-3 dB** | | | | **Ground start** | | | | | | |
| | **-X50** | | **45CXH** | | X | **X** | | | | | **X** | **X** | ② **-4.5/-2.5 dB** | | | | **Loop monitoring** | | | | | | |
| | **-X60** | | **458XH** | | X | **X** | | | | | **X** | **X** | **-7/0 dB** | | | | **and pole** | | | | | | |
| | | | | | | | | | | | | | **0/-7 dB** | | | | **changing** | | | | | | |
| | **-** | | **459XH** | | X | **X** | | | | **X** | | **X** | **-5/-2 dB** | | | | ④ = 4 different | | | | | | |
| **X120** | | | **45AXH** | | X | **X** | | | | **X** | | **X** | **-7/0 dB** | | | | ② = 2 different | | | | | | |
| | **-** | | | | | | | | | | | | **-5/-2 dB** | | | | | | | | | | |
| **X130** | | | | | | | | | | | | | **-6/0 dB** (Austr) | | | | Impedance combinations | | | | | | |
| | | | | | | | | | | | | | **-9/3 dB** (Austr) | | | | | | | | | | |
| | | | **457XH** | | X | **X** | | | **X** | | | **X** | **-5/-2 dB** (ITL) | | | | | | | | | | |
| | | | | | | | | | | | | | **-6/-1 dB** (ITL) | | | | | | | | | | |
| | **-** | | | | | | | | | | | | **-5.75/-*IL*: -8 / +2** | | | | | | | | | | |
| | | | **45FXH** | | X | **X** | | | | | | **X** | | | | | | | | | | | |
| **X310** | | | | | | | | | | | | | | | | | | | | | | | |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | | | | | | | | | | | | | | | | |
| *TMLRB* **-Q2186-X100** | | | **561XH** | | **X** | | **X** | | | | | | **1400 Ohm -6 / -1 dBr** | | | | **DUAL-SICOFI Trunk circuit with DID BPO loop signal. Ground signal recognition** | | | | | **8** | **1** |
| 1 --- a b | 2 --- a b | 3 --- a b | 4 --- a b | 5 --- a b | 6 --- a b | 7 --- a b | 8 --- a b | | | | | | | | | | | | | | | | |

*Table 8 Trunk connection to the MDF with CDR but without DID*

## 9.7 Creating a Strapping List, I.M.

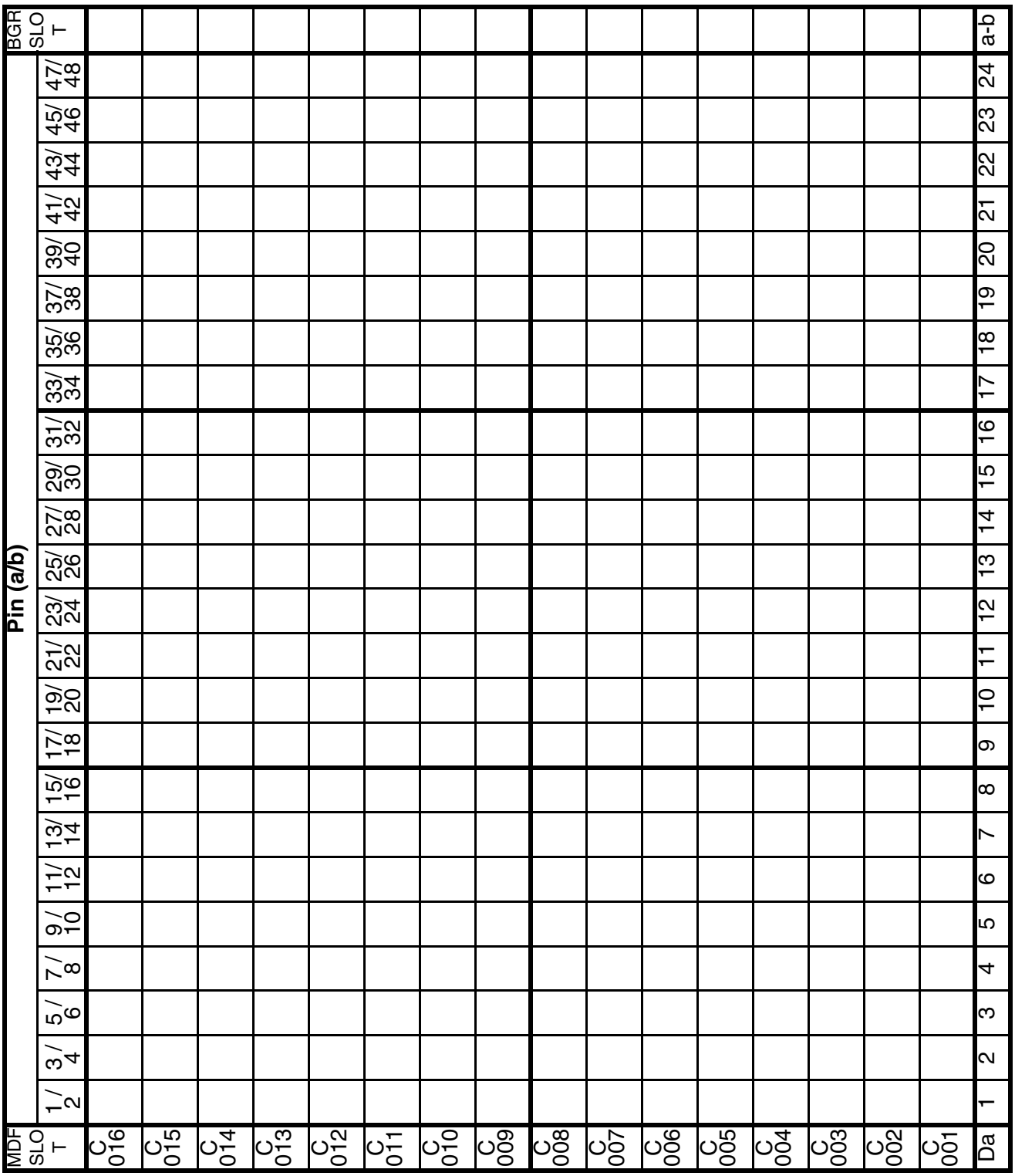
To create a list of all positions that are necessary in the MDF:

1. Use the tables in Section 9.7.1, “System Assignment 16/24 DA Splitting Strip” and Section 9.7.2, “Network Assignment 25/35 DA Strapping Connector” as templates to strapping the MDF.

   You can also query the assignment of positions with the AMOs SBCSU and SCSU.

2. Include these lists with the customer documentation. These are the current working documents for activities performed on the MDF.

## 9.7.1 System Assignment 16/24 DA Splitting Strip



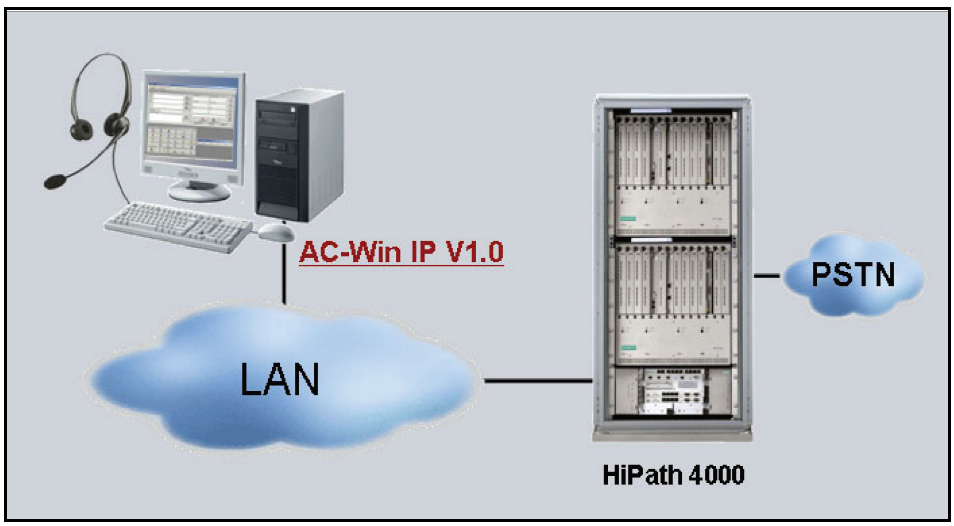
## 9.7.2 Network Assignment 25/35 DA Strapping Connector

| Pin (a/b) | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 / 2 | | | | | | | | | | | | | | | | | | | | |
| 3 / 4 | | | | | | | | | | | | | | | | | | | | |
| 5 / 6 | | | | | | | | | | | | | | | | | | | | |
| 7 / 8 | | | | | | | | | | | | | | | | | | | | |
| 9 / 10 | | | | | | | | | | | | | | | | | | | | |
| 11/12 | | | | | | | | | | | | | | | | | | | | |
| 13/14 | | | | | | | | | | | | | | | | | | | | |
| 15/16 | | | | | | | | | | | | | | | | | | | | |
| 17/18 | | | | | | | | | | | | | | | | | | | | |
| 19/20 | | | | | | | | | | | | | | | | | | | | |
| 21/22 | | | | | | | | | | | | | | | | | | | | |
| 23/24 | | | | | | | | | | | | | | | | | | | | |
| 25/26 | | | | | | | | | | | | | | | | | | | | |
| 27/28 | | | | | | | | | | | | | | | | | | | | |
| 29/30 | | | | | | | | | | | | | | | | | | | | |
| 31/32 | | | | | | | | | | | | | | | | | | | | |
| 33/34 | | | | | | | | | | | | | | | | | | | | |
| 35/36 | | | | | | | | | | | | | | | | | | | | |
| 37/38 | | | | | | | | | | | | | | | | | | | | |
| 39/40 | | | | | | | | | | | | | | | | | | | | |
| 41/42 | | | | | | | | | | | | | | | | | | | | |
| 43/44 | | | | | | | | | | | | | | | | | | | | |
| 45/46 | | | | | | | | | | | | | | | | | | | | |
| 47/48 | | | | | | | | | | | | | | | | | | | | |
| 49/50 | | | | | | | | | | | | | | | | | | | | |
| 51/52 | | | | | | | | | | | | | | | | | | | | |
| 53/54 | | | | | | | | | | | | | | | | | | | | |
| 55/56 | | | | | | | | | | | | | | | | | | | | |
| 57/58 | | | | | | | | | | | | | | | | | | | | |
| 59/60 | | | | | | | | | | | | | | | | | | | | |
| 61/62 | | | | | | | | | | | | | | | | | | | | |
| 63/64 | | | | | | | | | | | | | | | | | | | | |
| 65/66 | | | | | | | | | | | | | | | | | | | | |
| 67/68 | | | | | | | | | | | | | | | | | | | | |
| 69/70 | | | | | | | | | | | | | | | | | | | | |
| Slot - D | 0016 | 002 | 003 | 004 | 005 | 006 | 007 | 008 | 009 | 010 | 011 | 012 | 013 | 014 | 015 | 016 | 017 | 018 | 019 | |

# 10 Installing Peripheral Equipment

## 10.1 Installing the AC-WIN IP Attendant Console

The AC-Win IP V1.0 attendant console is connected over IP to an HG3530 V2.0 in a HiPath 4000 V2.0 / V3.0 / V4 or V5 system. The USB device (handset and headset) is connected to the PC. Although any standard commercial PC can be used, Fujitsu-Siemens PCs have been tested and are recommended. The functionality offered is only provided via software.




***IMPORTANT:*** For detailed information on installation and configuration, refer to the latest service manual for the AC-Win IP enhanced attendant console.

## 10.2 Connecting the Service Terminal

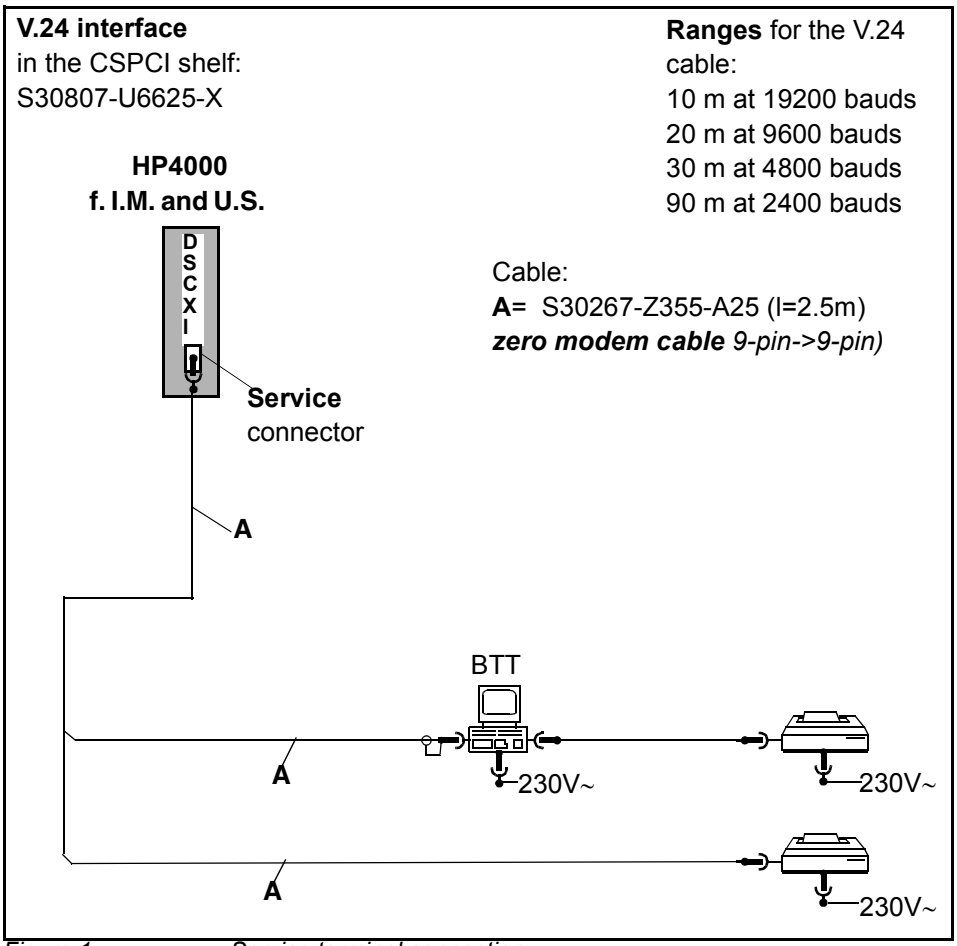



*Figure 1 Service terminal connection*

## 10.3 Hicom Teleservice HTS

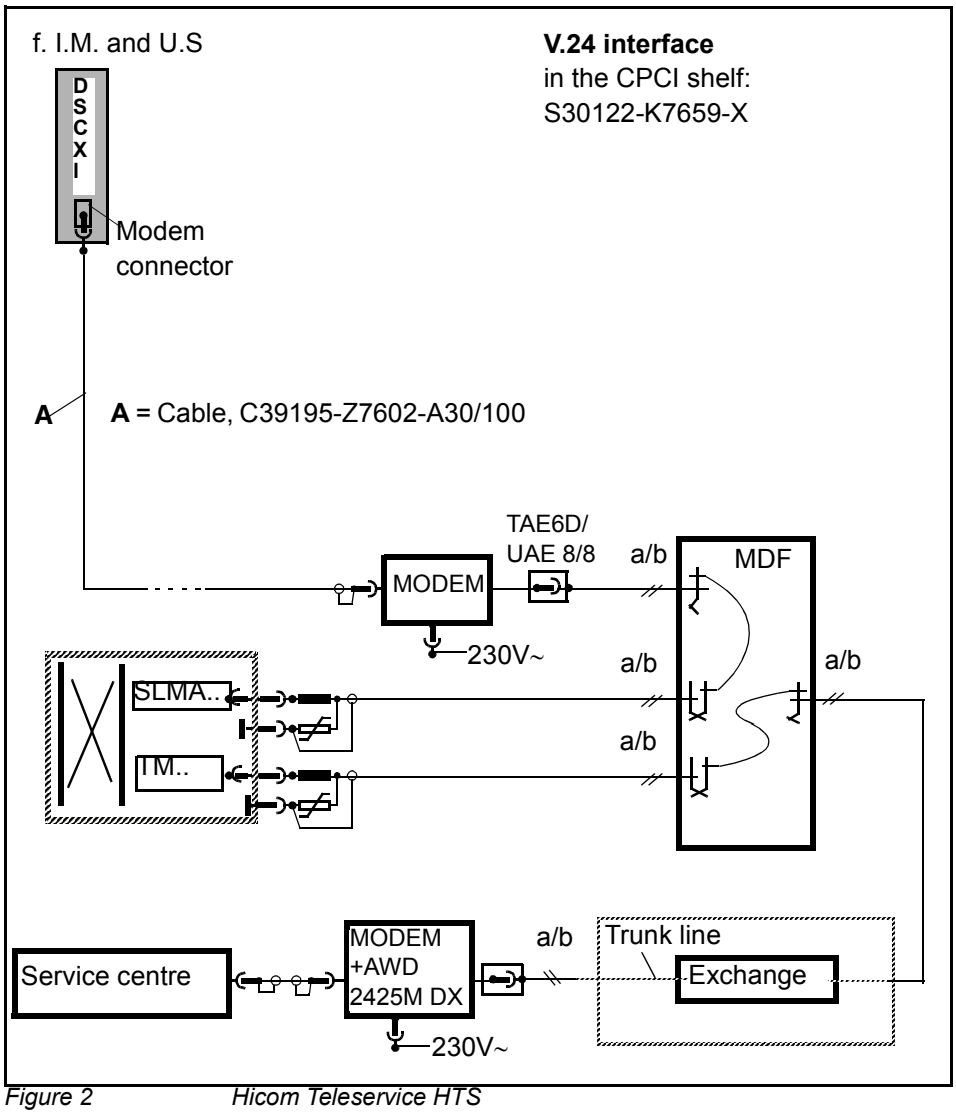


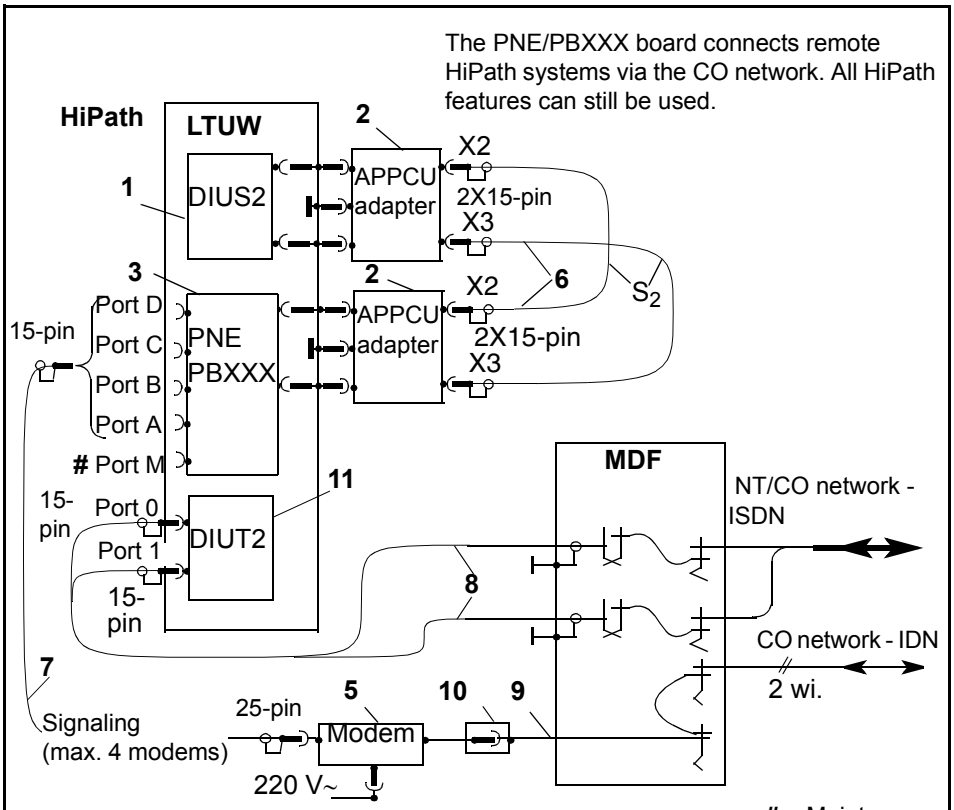

*Figure 2 Hicom Teleservice HTS*

## 10.4 Connecting Cables

***NOTE:*** The shield of all front cables (except network cables and optical fiber cables) must be secured to the frame with two cable ties at the shelf opening. See also Section 4.4, “Shielding Connection on the Opening of the LTU Frame”.

## 10.4.1 Connecting ISDN Connections

### 10.4.1.1 PNE/PBXXX Back-to-Back with Modem and DIUT2

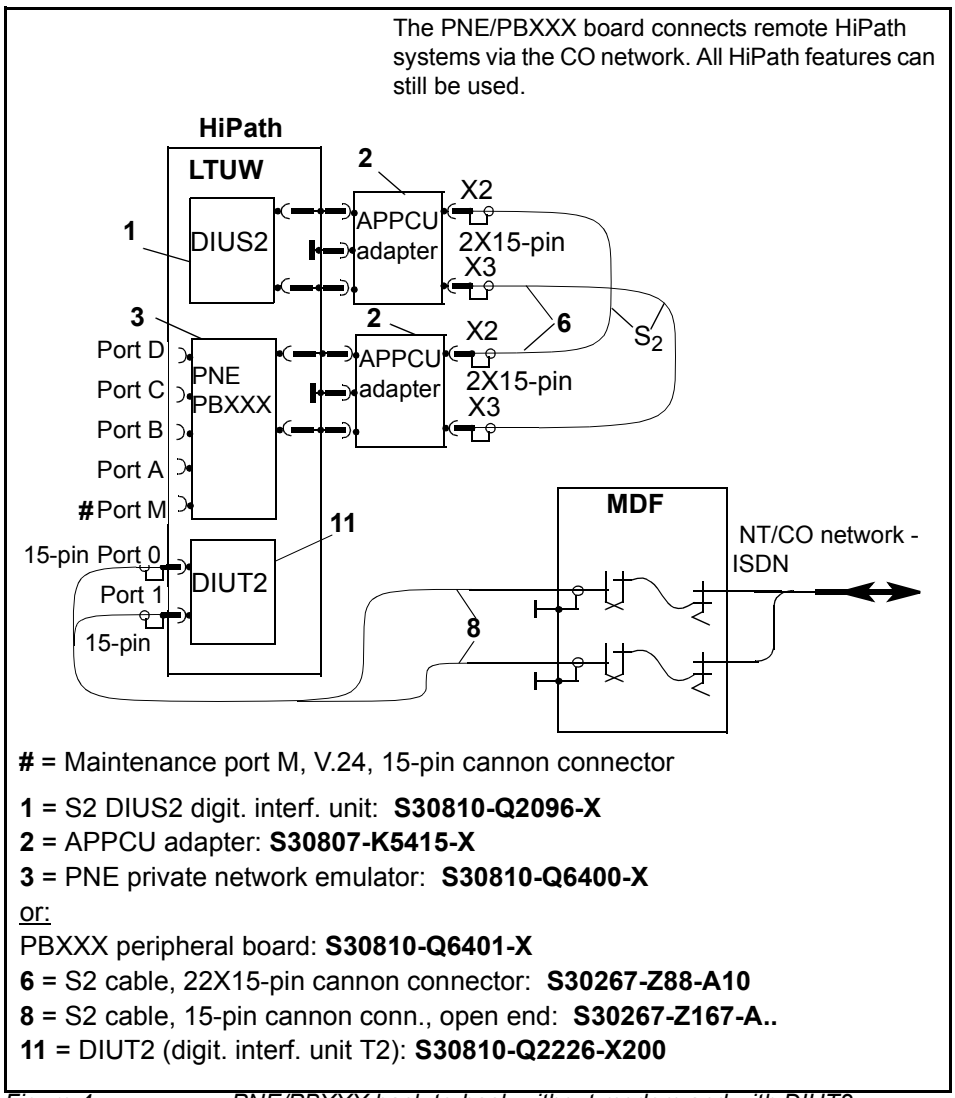



**1** = S2 DIUS2 digit. interf. unit: **S30810-Q2096-X**
**2** = APPCU adapter: **S30807-K5415-X**
**3** = PNE private network emulator: **S30810-Q6400-X**
or:
PBXXX peripheral board: **S30810-Q6401-X**
**5** = Modem e.g. CPV, V.32bis: **S30122-X5621-X**
**6** = S2 cable, 2X15-pin cannon connector: **S30267-Z88-A10**
**7** = V.24 cable, 15/25-pin cannon conn.,10m: **C39195-Z7267-C2**
**8** = S2 cable, 15-pin cannon conn., open end: **S30267-Z167-A..**
**9** = S-Y(St)Y 16x2x0.4 cable
**10** = UAE 8/8 AP: **L30460-X 951-X**,
UP: **L30460-X 952-X**,
AP/UP: **L30460-X 958-X**
TAE6D: **C39334-Z7052-C11**
**11** = DIUT2 (digit. interf. unit T2): **S30810-Q2226-X200**

**#** = Maintenance port M, V.24, 15-pin cannon connector

*Figure 3 PNE/PBXXX back-to-back with modem and DIUT2*

### 10.4.1.2 PNE/PBXXX Back-to-Back with DIUT2

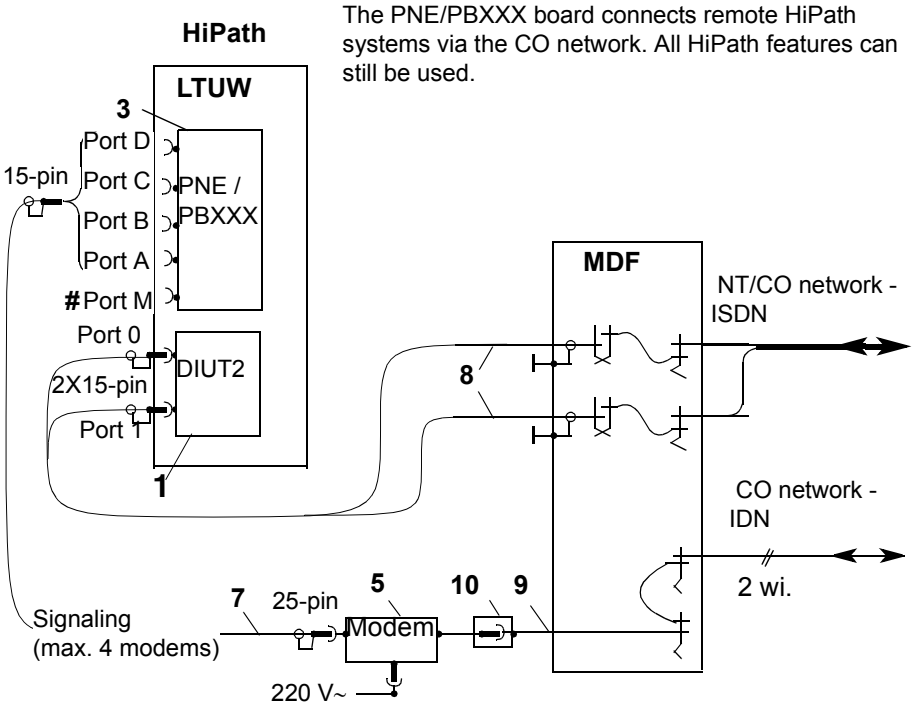



**#** = Maintenance port M, V.24, 15-pin cannon connector

**1** = S2 DIUS2 digit. interf. unit: **S30810-Q2096-X**
**2** = APPCU adapter: **S30807-K5415-X**
**3** = PNE private network emulator: **S30810-Q6400-X**
or:
PBXXX peripheral board: **S30810-Q6401-X**
**6** = S2 cable, 22X15-pin cannon connector: **S30267-Z88-A10**
**8** = S2 cable, 15-pin cannon conn., open end: **S30267-Z167-A..**
**11** = DIUT2 (digit. interf. unit T2): **S30810-Q2226-X200**

*Figure 4 PNE/PBXXX back-to-back without modem and with DIUT2*

### 10.4.1.3 PNE/PBXXX Back-to-Back with Modem in DIUS2 Emulation with DIUT2

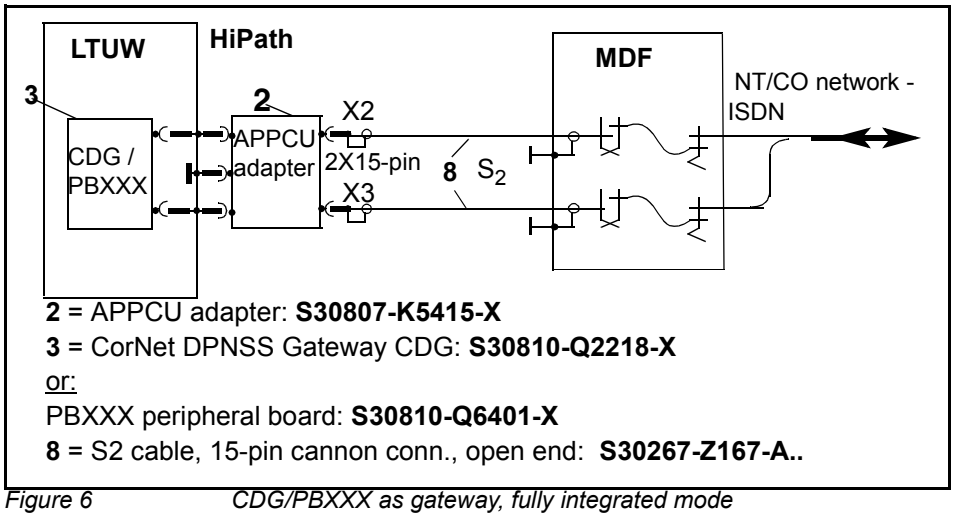



**#** = Maintenance port M, V.24, 15-pin cannon connector

**1** = DIUT2 (digit. interf. unit T2): **S30810-Q2226-X200**
**3** = PNE private network emulator: **S30810-Q6400-X**
or:
PBXXX peripheral board: **S30810-Q6401-X**
**5** = Modem e.g. CPV, V.32bis: **S30122-X5621-X**
**7** = V.24 cable, 15/25-pin cannon conn.,10m: **C39195-Z7267-C2**
**8** = S2 cable, 15-pin cannon conn., open end: **S30267-Z167-A..**
**9** = S-Y(St)Y 16x2x0.4 cable
**10** = UAE 8/8 AP: **L30460-X 951-X**,
UP: **L30460-X 952-X**,
AP/UP: **L30460-X 958-X**
TAE6D: **C39334-Z7052-C11**

*Figure 5 PNE/PBXXX back-to-back with modem in DIUS2 emulation with DIUT2*

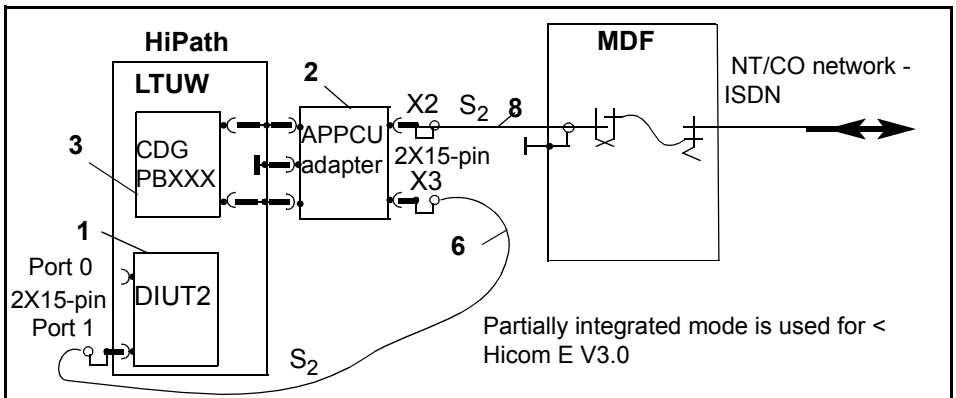
### 10.4.1.4 CDG/PBXXX as Gateway, Fully Integrated Mode




**2** = APPCU adapter: **S30807-K5415-X**
**3** = CorNet DPNSS Gateway CDG: **S30810-Q2218-X**
or:
PBXXX peripheral board: **S30810-Q6401-X**
**8** = S2 cable, 15-pin cannon conn., open end: **S30267-Z167-A..**

*Figure 6 CDG/PBXXX as gateway, fully integrated mode*

### 10.4.1.5 CDG/PBXXX with DIUT2 as Gateway, Partially Integrated Mode




**1** = DIUT2 (digit. interf. unit T2): **S30810-Q2226-X200**
**2** = APPCU adapter: **S30807-K5415-X**
**3** = CorNet DPNSS Gateway CDG: **S30810-Q2218-X**
or:
PBXXX peripheral board: **S30810-Q6401-X**
**6** = S2 cable, 2X15-pin cannon connector: **S30267-Z88-A10**
**8** = S2 cable, 15-pin cannon conn., open end: **S30267-Z167-A..**

*Figure 7 CDG/PBXXX with DIUT2 as gateway, partially integrated mode*

## 10.5 Installing the Breakout Box

The cable supplied with the breakout box is 1 meter (3 ft.) long. If the breakout box is installed more that 1 meter (3 ft.) from the HiPath 4000, an additional standard 25-pair extension cable with Amphenol connectors can be installed between the breakout box cable and the breakout box.

Because the breakout box cable is unbalanced, any additional length added to the HiPath 4000 side of the breakout box must be subtracted from the distance on the peripheral device side of the breakout box. The total distance of the EIA/TIA-232-E cabling from the peripheral device to the HiPath 4000 **must not exceed a total distance of 15.24** m (50 ft.) without the addition of line drivers.

If the peripheral device is not located near the HiPath 4000, refer to the *Siemens HiPath 4000 Customer Site Planning Guide and AC and DC Systems Power and Grounding Specifications, G281- 0725-00* for detailed power and grounding information.

Install the breakout box (see Figure 8) as follows:

1. Attach the ground wire to the ground lug on the right side of the breakout box.
2. Attach the other end of the ground wire to the system supplemental ground.

---

***IMPORTANT:*** This step is not necessary for new breakout boxes.

---

3. For the wall-mounted breakout box, install the wall-mounting bracket on the wall.
4. Position the breakout box onto the wall-mount bracket or rack as applicable.
5. Install the mounting screws on the left and right ends of the breakout box faceplate.
6. Attach the cables to the breakout box as follows:
   a) Attach the breakout box cable SIVAPAC connector to the appropriate card slot location at the backplane.
   b) Attach the breakout box cable Amphenol connector to the breakout box J1 connector.

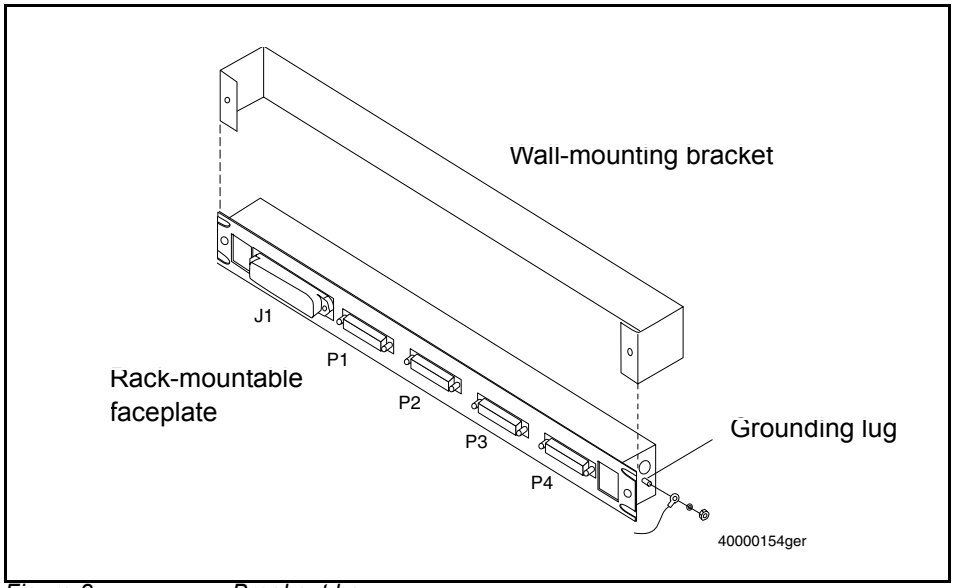



*Figure 8 Breakout box*

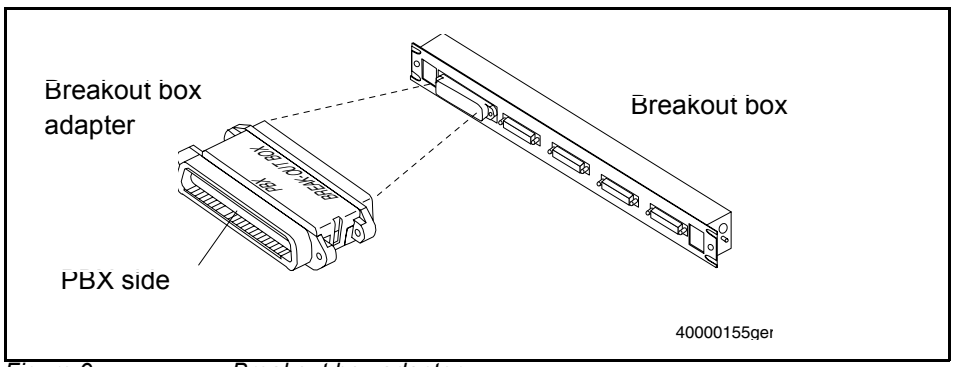



*Figure 9 Breakout box adapter*

## 10.6 Installing the Distance Adapter

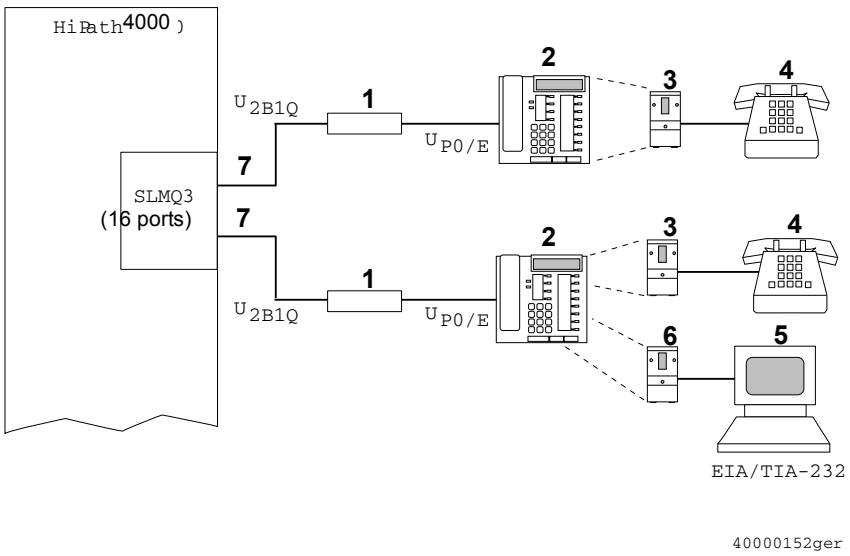
The distance adapter converts the 2-wire $U_{2B1Q}$ interface of the subscriber line module 2B1Q 3 (SLMQ3) board to the $U_{P0/E}$ interface of the Optiset E or OptiPoint telephone.

To install the distance adapter:

1. At the back of the distance adapter, connect one end of a line cord to the $U_{P0/E}$ connector (see Figure 10).
2. Connect the other end of the line cord to the Optiset E or OptiPoint telephone.
3. At the back of the distance adapter, connect another line cord to the PABX $U_{2B/1Q}$ connector.
4. Connect the other end of the line cord to the MDF.

5. Plug the power supply into an ac outlet
6. At the back of the distance adapter, connect the other end of the power supply into the PS connector.

***IMPORTANT:*** For additional information, refer to the installation instructions that are shipped with the product.




**1** - Distance adapter
**2** - Optiset E (primary)
**3** - Analog adapter
**4** - Analog device
**5** - EIA/TIA-232-E data device
**6** - Data adapter
**7** - 6000 meters

*Figure 10 Connectivity options for the distance adapters*

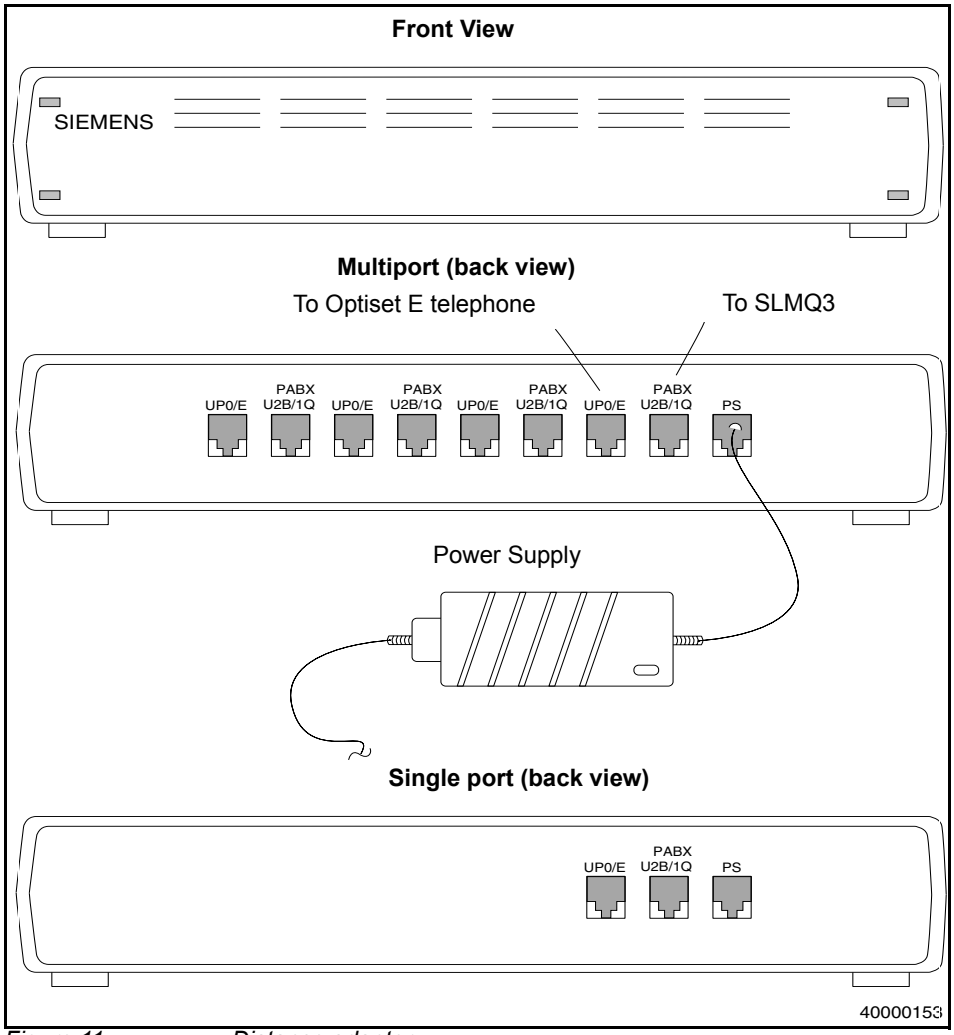



*Figure 11 Distance adapter*

# 11 Installing the IPDA

This chapter describes the connection of the HiPath 4000 to the (IP Distributed Architecture) IPDA system. It also provides procedures to install the HiPath IPDA components.

---

***IMPORTANT:*** Refer to the HiPath 4000 Service Manual for additional information about the IPDA installations (IP solutions).

---

Figure 1 on page 212 shows a diagram of the HiPath 4000/IPDA connectivity. The systems can be installed as free-standing systems or can be built into a 19-inch cabinet.

HiPath 4300 supports up to 40 access points connected over IP (AP 3300 IP or AP 3700-9 IP) as well as up to 3 shelves that are connected directly (AP3300/ AP3700-9 IP).

HiPath 4000 facilitates the distribution of access points over an IP network. These access points are shelves (AP3300 IP or AP3700-9 IP) that accommodate standard HiPath 4000 interface modules. The stations at the access points are treated in exactly the same way as if they were directly connected to a HiPath 4000 system as before. All IP-distributed components are administered as a **single** system over one HiPath 4000 system connection point.

The system consists of a maximum 4 stacks (AP 3300 IP only) and one power management unit attached to each other in a single row. The system can be placed anywhere in the room (maximum expansion of 15 LTUW = 5760 ports). Each stack can be configured with up to 4 boxes. The stacks are permanently connected. A maximum of 6 wall main distribution frames (MDFHX6) can be used. This corresponds to expansion up to a maximum 2304 ports.

Cabling should only be configured underfloor (double floor). The reference point for system cabling is located at the lower end of the stack (see Figure 7).

The system can also be configured using IPDA instead of one single stack (maximum of four boxes for every stack). These systems can be installed as free-standing systems or can be built into a 19-inch cabinet.

HiPath 4500 supports up to 83 IP-connected access points (AP 3300 IP or AP 3700/9 IP) in addition to up to 15 directly connected module frames (AP 3300).

HiPath 4000 also facilitates the distribution of access points over an IP network. These access points are frames (AP 3300 IP or AP 3700/9 IP) that include standard HiPath 4000 interface modules. User connection to access points is identical to standard, direct connection to a HiPath 4000 system. Administration of all IP-distributed components is carried out as a **single** system using a HiPath 4000 system connection point.

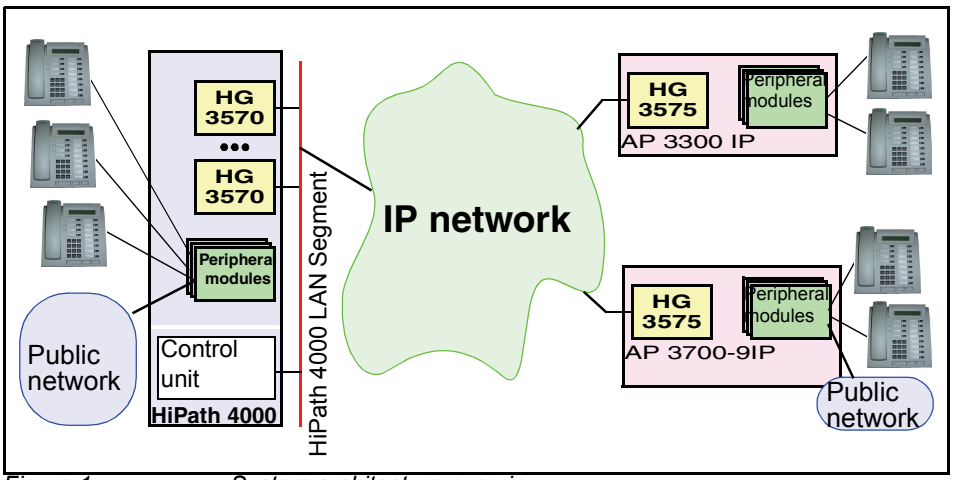



*Figure 1 System architecture overview*

***NOTE:*** Each cabinet, including the front cover, forms a shielded unit. Ensure to lock the cabinets while the system is running and replace the covers immediately following testing and maintenance.

# 11.1 IPDA Connection Variants

## 11.1.1 Connecting to AP 3700-9 IP

This section describes possible connections for IPDA system installations: HiPath 4000 permits you to use both existing AP 3300 cabinets (L80XF) and the new AP 3700 IP cabinets (AP 3700-9 IP) as IPDA frames (see Figure 2 on page 213).

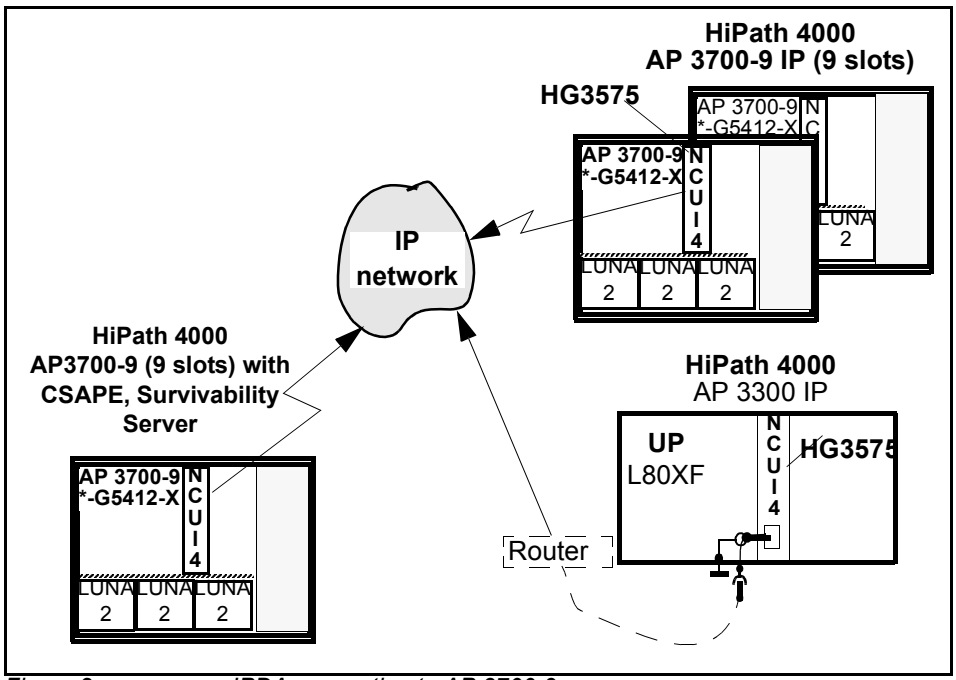



*Figure 2 IPDA connection to AP 3700-9*

## 11.1.2 Connecting to LTUW/L80XF

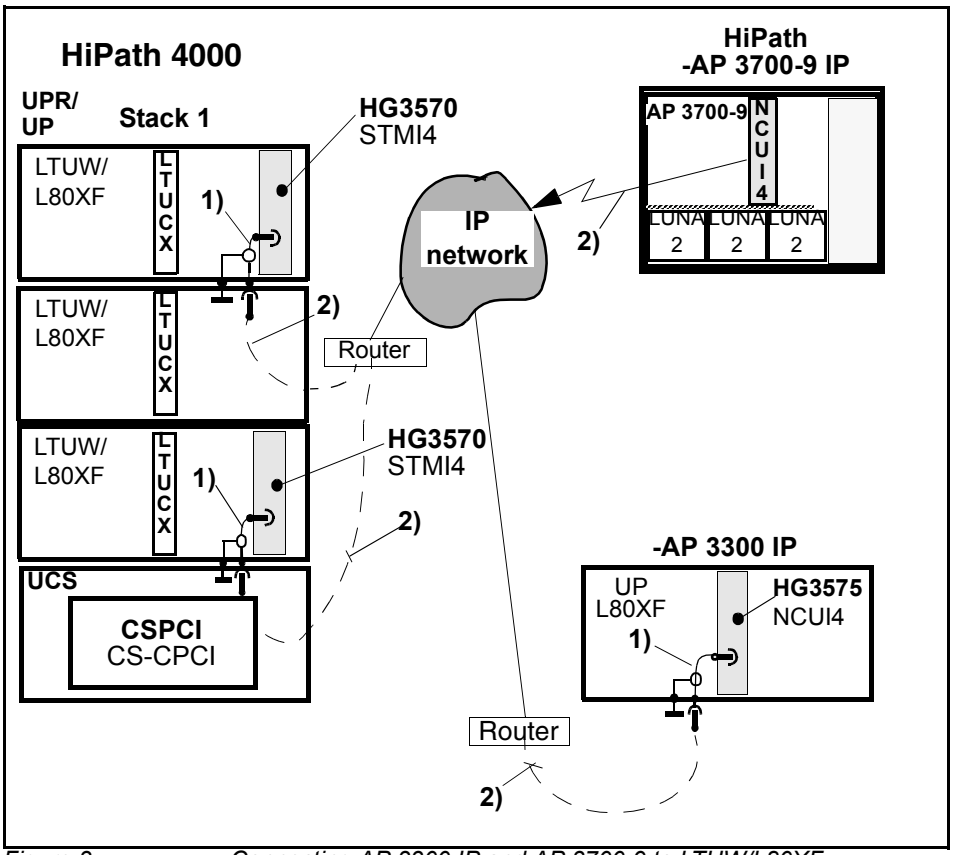



*Figure 3 Connecting AP 3300 IP and AP 3700-9 to LTUW/L80XF*

# 12 Starting the System

This chapter describes the commissioning and startup of the HiPath 4000 system.

## 12.1 Completing the Installation

Once you have completed the installation process, double-check the items in Table 1.

| Step | Check | Completed? |
|---|---|---|
| 1 | Screw connections secure? | |
| 2 | Grounding system connected correctly (system/MDF)?<br>See Chapter 6, "Grounding the HiPath 4000". | |
| 3 | Mains connection protected by fuses? | |
| 4 | Power supply connected correctly (internal/external)?<br>Chapter 7, "Connecting to the Mains and Power Supply". | |
| 5 | Cable connectors secure?<br>See Section 12.2.2, “Checking the Signal Cable Connections”. | |
| 6 | Cables laid correctly (with cable grips)?<br>Refer to Chapter 8, "Internal Line Cables" and Section , “External Cabling Assemblies”. | |
| 7 | MDF layout plan completed? | |
| 8 | Covers replaced correctly (necessary only if the system is not started immediately after installation)?<br>See Section 12.15, “Replacing the Covers”. | |
| 9 | Documentation assembled and handed over to the customer? | |

*Table 1 Post-installation checklist*

## 12.2 Pre-Power On Checks

Perform the following procedures before you apply power to the system.

## 12.2.1 Reseating the Boards

***IMPORTANT:*** Do not use ESD procedures when working with power supplies. If any power supplies becomes unseated during transport, reseat it by gently pushing it toward the backplane until it seats in place.

If any board becomes unseated during transport, reseat it as follows:

1. Follow the electrostatic discharge prevention procedures.
2. Insert the peg of the board removal tool into the hole at the top of the unseated board.
3. Lift the board removal tool and completely unseat the board.
4. Remove the board removal tool.
5. Gently push the board toward the backplane until it seats in the backplane connector.

## 12.2.2 Checking the Signal Cable Connections

LTU shelf signal cables are signal cables that originate at the LTU shelf backplane.

To ensure that all signal cable connections are secure:

1. Check that all signal cables are tightly secured at the connector on each shelf backplane.
2. Check that the connectors on the other end of the signal cables are tightly secured.
3. If signal cables were disconnected during transit, refer to the hardware map to connect and secure these cables to the proper locations.

### 12.2.3 Checking the Power Distribution Cable Connections

The system is shipped with the power distribution cables already connected to the backplane. These cables may become disconnected during transit. To check that the power distribution cable connections in each cabinet:

1. Check for loose or disconnected power distribution cable connections at the backplanes.
2. If there are any loose or disconnected power distribution cable connections, refer to the hardware map to connect and secure these cables to the proper locations.

## 12.3 Turning on a Nonredundant AC-Powered HiPath 4000

To turn on a nonredundant ac-powered HiPath 4000:

**WARNING**

**Observe all applicable safety precautions when working with high voltages.**

1. Remove the tie-wrap from the power cord and uncoil.
2. Plug the ac power cord to the wall outlet.
3. Plug the other end of the ac power cord to the LPC80.
4. Turn on the power switch on the LPC80.
5. Turn on the power switch on the PSUP.

## 12.4 Turning on Cabinet 1 and 2 of a Redundant AC-Powered HiPath 4000

To turn on cabinet 1 of an ac-powered HiPath 4000:

**WARNING**

**Observe all applicable safety precautions when working with high voltages.**

1. Plug in the HiPath 4000 power cord to the wall outlet.
2. At the back of the cabinet: Turn on the main circuit breaker under the CSPCI shelf (see Figure 2 on page 221).
3. At the ACDPX board in UACD stack 1: Turn on the ac input power switches.
4. At the PDPX2 terminal field in UACD stack 1: Turn on the ac output power module (PM1, PM2, and PM3) circuit breakers.
5. At the PDPX2 terminal field in UACD stack 1: Turn on the circuit breakers for the
   –48-V trunks (BULK and TALK).
6. At the back of UACD stack 1: Turn on the backup battery circuit breaker.

   ***IMPORTANT:*** ECCB is not used in the U.S.

7. Turn on the dc-to-dc shelf power supplies in the following order:
   a) Shelf 1
   b) Remaining dc-to-dc shelf power supplies
8. At the PDPX2 terminal field in UACD stack 1: Turn on the power share circuit breaker.

## 12.5 Turning on Cabinet 3 and 4 of a Redundant AC-Powered HiPath 4000

To turn on cabinet 3 of an ac-powered HiPath 4000:

**WARNING**

**Observe all applicable safety precautions when working with high voltages.**

1. Plug in the HiPath 4000 power cord to the wall outlet.
2. At the back of the cabinet: Turn on the main circuit breaker under the CSPCI shelf (see Figure 2 on page 221).
3. At the ACDPX board in UACD stack 2: Turn on the ac input power switches.
4. At the PDPX2 terminal field in UACD stack 2: Turn on the ac output power module (PM1, PM2, and PM3) circuit breakers.
5. At the PDPX2 terminal field in UACD stack 1: Turn on the –48-V circuit breakers (BULK and TALK).
6. At the back of UACD stack 2: Turn on the backup battery circuit breaker.

***IMPORTANT:*** ECCB is not used in the U.S.

7. Turn on the dc-to-dc shelf power supplies in the following order:
   a) Shelf 1
   b) Remaining dc-to-dc shelf power supplies
8. At the PDPX2 terminal field in UACD stack 2: Turn on the power share circuit breaker.

## 12.6 Turning on Cabinet 1 of a DC-Powered HiPath 4000

To turn on cabinet 1 of a dc-powered HiPath 4000:

1. At the dc system switchboard: Turn on and tag off the circuit breaker for the dc electric circuit in cabinet 1.
2. At the back of cabinet 1 (under the CSPCI shelf): Turn on the main circuit breaker (see Figure 2).
3. At the ICBP field in the UDCD cabinet in stack 1: Turn on the PMOD power switches (see Figure 1).
4. Turn on the cabinet 1 dc-to-dc shelf power supplies in the following order:
   a) Shelf 1 (CSPCI shelf, cabinet 1)
   b) Remaining dc-to-dc shelf modules
5. At the front of UDCD cabinet 1 stack 1 ODP (Figure 3): Turn on the -48-V TALK circuit breaker.


*Figure 1 ICBP*

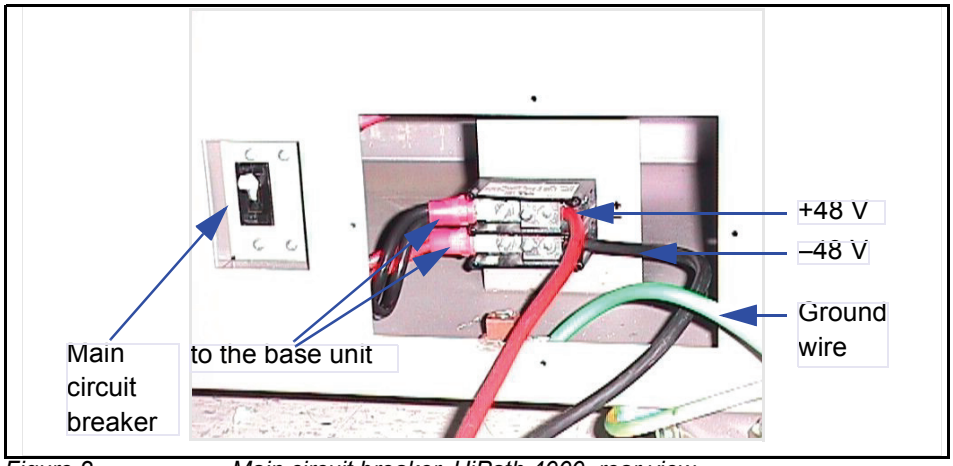



*Figure 2 Main circuit breaker, HiPath 4000, rear view*

## 12.7 Turning on Cabinet 2 of a DC-Powered HiPath 4000

To turn on cabinet 2 of a dc-powered HiPath 4000:

1. At the dc system switchboard: Turn off and tag off the circuit breaker for cabinet 2.
2. At the back of cabinet 2 (under the CSPCI shelf): Turn on the main circuit breaker (see Figure 2).
3. At the ICBP field in UDCD cabinet 1 in stack 2: Turn on the PMOD power switches (see Figure 1).
4. At the front of UDCD cabinet 1 stack 2 ODP: Turn on the -48-V BULK circuit breaker (see Figure 3).

*Figure 3 Output distribution panel, front view*

In cabinet 2 in the HiPath 4000 system: Turn on the dc-to-dc shelf power supplies in the following order:

a) Shelf 1, (CSPCI shelf, cabinet 2)

b) Remaining dc-to-dc shelf power supplies

5. At the front of UDCD cabinet 1 stack 2 ODP: Turn on the -48-V TALK circuit breaker (see Figure 3).

## 12.8 Turning on Cabinet 3 of a DC-Powered HiPath 4000

To turn on cabinet 3 of a dc-powered HiPath 4000:

1. At the dc system switchboard: Turn off and tag off the circuit breaker for cabinet 3.
2. At the back of cabinet 3 (under the CSPCI shelf): Turn on the main circuit breaker.
3. At the ICBP field in UDCD cabinet 2 in stack 1: Turn on the PMOD power switches.
4. In cabinet 3 in the HiPath 4000 system: Turn on the dc-to-dc shelf power supplies in the following order:
5. Shelf 1 (CSPCI shelf, cabinet 1)
6. Remaining dc-to-dc shelf power supplies
7. At the front of UDCD cabinet 2 stack 1 ODP: Turn on the -48-V TALK circuit breaker.

## 12.9 Turning on Cabinet 4 of a DC-Powered HiPath 4000

To turn on cabinet 4 of a dc-powered HiPath 4000:

1. At the dc system switchboard: Turn off and tag off the circuit breaker for cabinet 4.
2. At the back of cabinet 4 (under the CSPCI shelf): Turn on the main circuit breaker.
3. At the ICBP field in UDCD cabinet 2 in stack 2: Turn on the PMOD power switches.
4. At the front of UDCD cabinet 2 stack 2 ODP: Turn on the -48-V BULK circuit breaker.

5. In cabinet 4 in the HiPath 4000 system: Turn on the dc-to-dc shelf power supplies in the following order:
6. Shelf 1, (CSPCI shelf, cabinet 1)
7. Remaining dc-to-dc shelf power supplies
8. At the front of UDCD cabinet 2 stack 2 ODP: Turn on the –48-V TALK circuit breaker (see Figure 3).

## 12.10 Activating the Clock Battery on the DSCXL Board

The battery backup ensures that the power supply to the system clock is retained in the event of a power failure, guaranteeing accurate timing for up to 48 hours.

---

***NOTE:* Warning: Static Sensitive Devices**
Observe all precautions for prevention of electrostatic discharge (ESD). Failure to follow ESD prevention procedures can result in permanent or intermittent board failures.

---

The clock battery is located on the DSCXL boards. The battery is no longer activated by jumper settings but by the software.

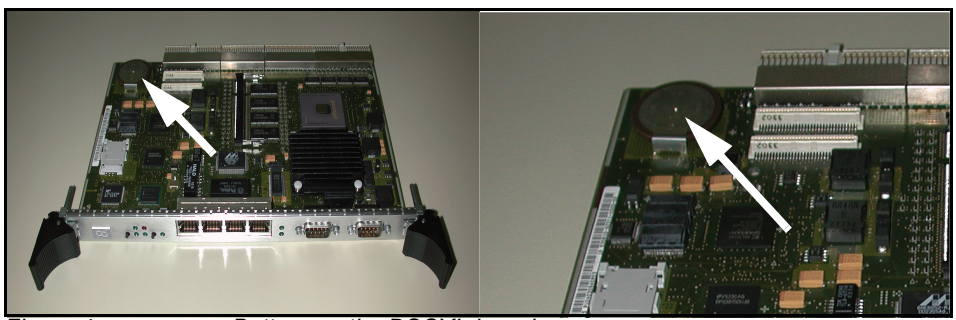


*Figure 4 Battery on the DSCXL board*

## 12.11 Setting the Date and Time

The system time is needed for all central messages and is output to all digital terminals. Set the current date and time using the AMO DATE.

---

***IMPORTANT:*** Expect a time delay until the digital terminals have accepted the change (time/date). The change (time/date) is only implemented on the attendant console when you remove and then reinsert the handset cord.

---

If the lithium battery on the DSCXL board is fully charged, the clock continues to function for up to 48 hours after a power failure.

## 12.12 Installing the Customer Database

To install the customer HD, use either the:

- Complete customer database from the HD or
- Generate the customer database on-site

  The database is generated in two ways:

  – Factory-generated hard disk

  – Site-generated database

## 12.12.1 Factory-Generated Database

In this scenario, the factory generates the customer database onto the hard disk and ships it with the system. The service technician can start up the system immediately after it is installed.

Figure 5 shows a flowchart of a system startup from the hard disk.

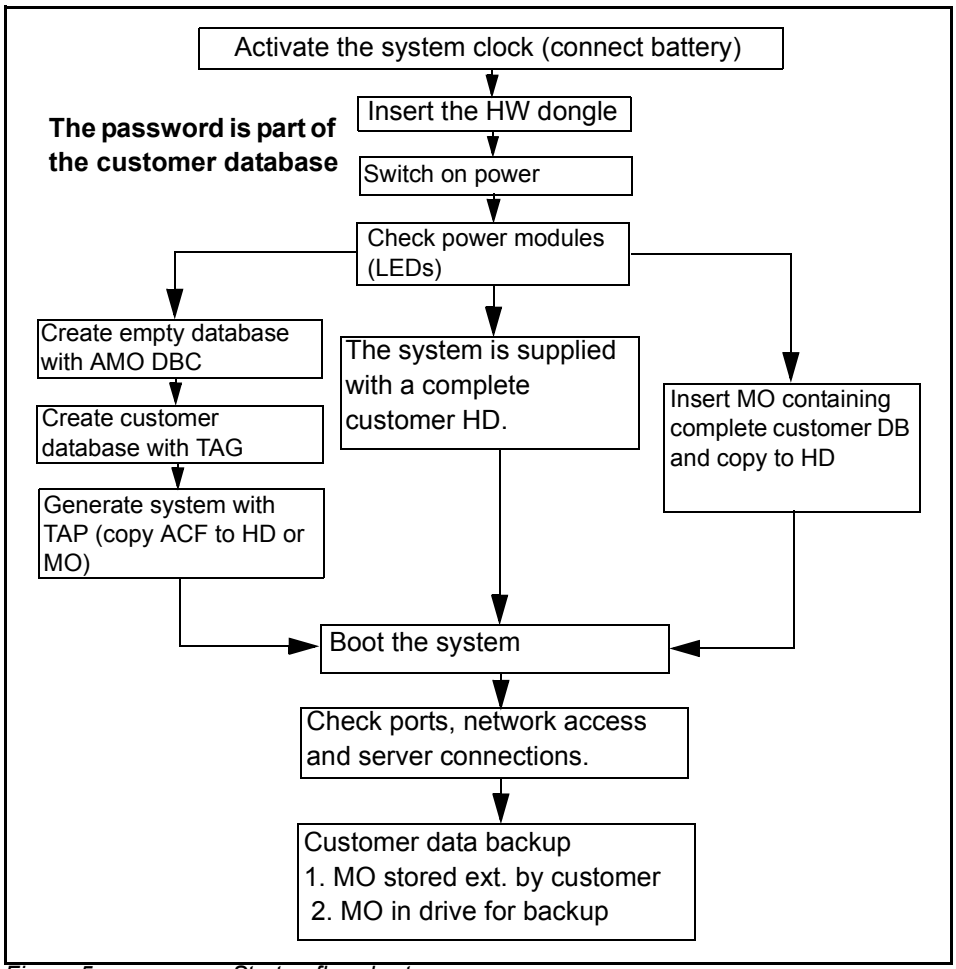



*Figure 5 Startup flowchart*

## 12.12.2 Site-Generated Database

In this scenario, the system is only supplied with a test database. The service technician must create the customer database before the system can be started up. This can be done on-site or in the Customer Support Center (CSC). Figure 6 shows a flowchart of generating the database on site.

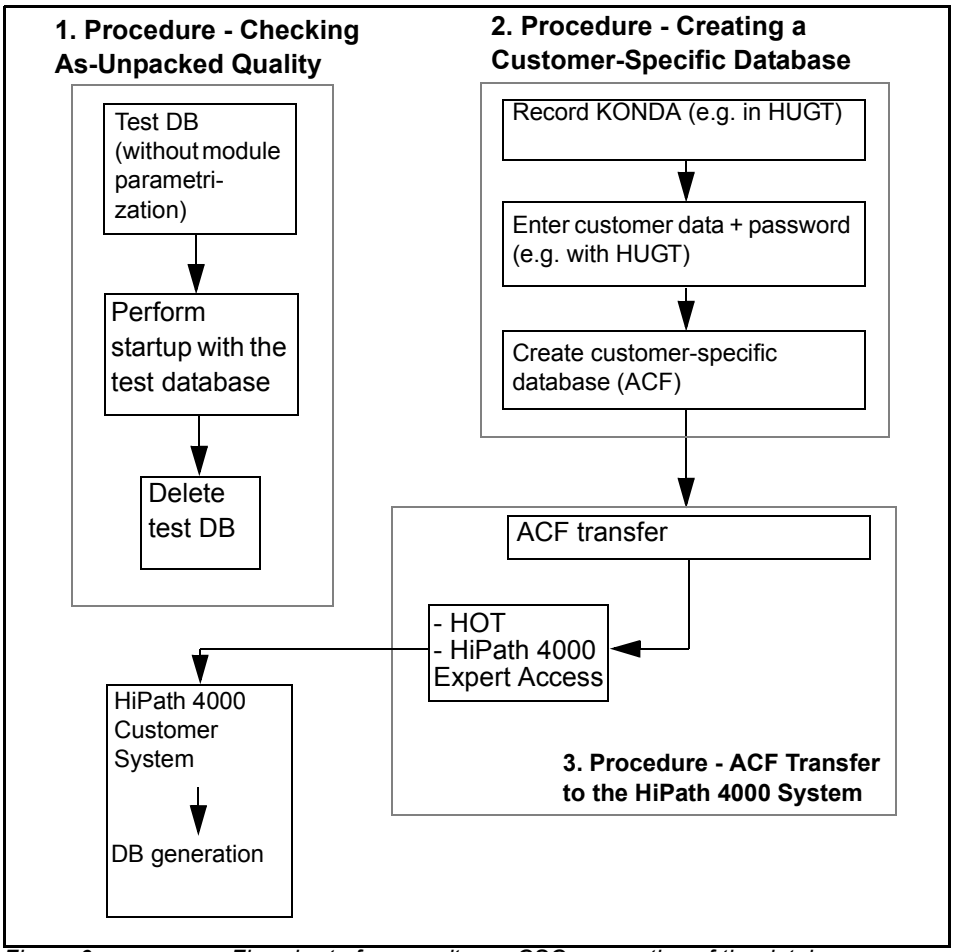



*Figure 6 Flowchart of an on-site- or CSC-generation of the database*

***IMPORTANT:*** During HW updates, you must maintain the **AMO TINFO**. This AMO is used to manage the technical data required for the configuration and upgrade of a system. The AMO TINFO also has a notepad function which you can use for making additional entries.

## 12.13 Starting the System

When you start the HiPath 4000 system (PABX), use the SSDs or LEDs to identify the different load states that are reached. These displays can help you check the PABX start up errors, if any.

***IMPORTANT:*** When importing systems into non-European (EU) countries, customs regulations stipulates that the system must not be operable when imported. To do this, connect the SCSI-ADDRESS jumper of the HD to a value other than 0.
In countries such as AFTA countries, India or the People's Republic of China, the MOD must copied to the HD after delivery of the system.

***NOTE:*** If the system is brought into the equipment room from a cold environment, condensation may occur. Wait until the system temperature is balanced and the system is completely dry before starting it up.

To perform a startup:

1. Ensure that the plug has been ECOS-tested for safety purposes.
2. Ensure that the LPC80 and PSUPs are off.
3. Plug the LPC80 power plug into the base unit assembly (BUA) that is located underneath the CSPCI box.
4. Turn on the LPC80 (-48V).
5. Activate all LPC80s first and then activate all PSUPs.
6. If a customer HD is not available, insert the MO disk containing the customer database in the MO disk drive.
   If a complete customer HD is available, replace the test database on the system with the customer HD database and restart the system.
7. If the system is being started from the MO disk with the test database, initiate the startup of the HiPath 4000 by pressing the LCT key on the DSCXL board.
   If the system is being started from the hard disk drive, the system starts up as soon as it is turned on.
8. Check the progress of the startup by checking the SSD on the DSCXL board.

| Operating Status | Explanation |
|---|---|
|  | ADP is started up |
|  | SWU is started up |

*Table 2 DSCXL, 7-segment display*

## 12.14 Connecting to the TAP, I.M.

To connect to the TAP:

***IMPORTANT:*** In I.M., TAP is used to identify the laptop of the service technician.

1. Connect the relevant V.24 cable to the V.24 port of the TAP (in the U.S., COM1 or COM2 port).
2. Connect the other end of the cable to the V.24 port of the DSCXL board (see Figure 7).
3. Connect the power cable of the TAP to an ac outlet.

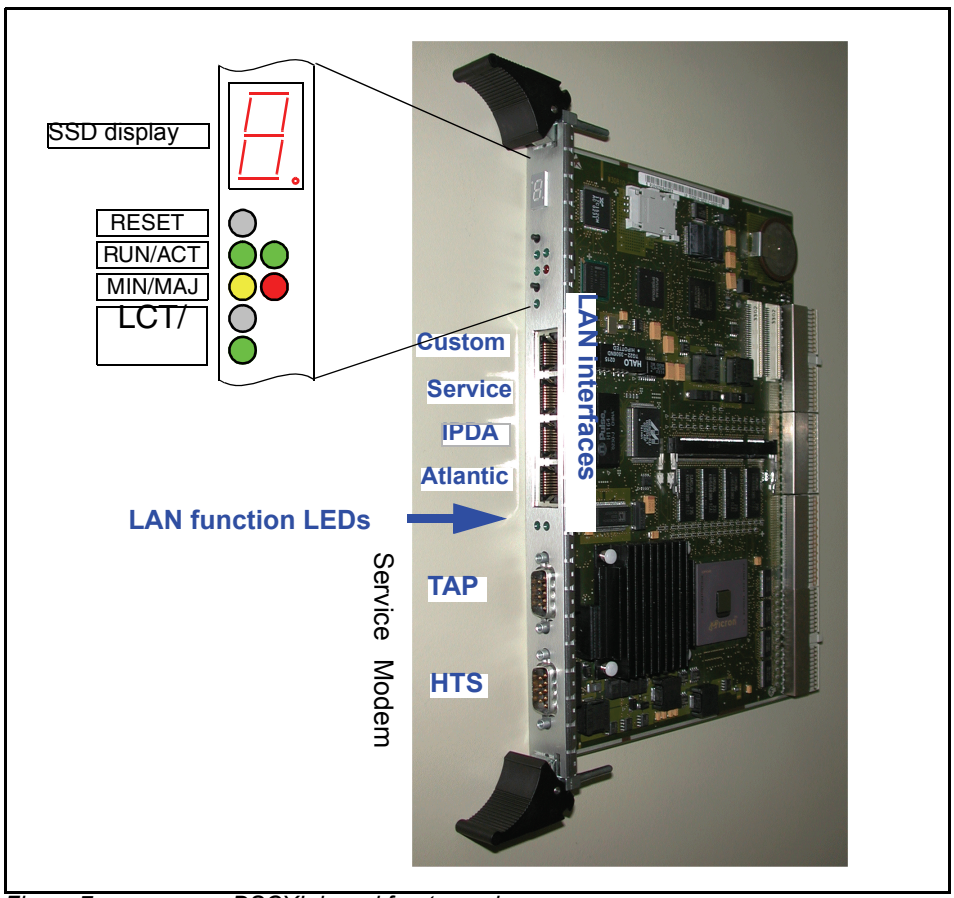



*Figure 7 DSCXL board front panel*

## 12.15 Replacing the Covers

Replace the individual covers when the system has been fully mounted, cabled, and put into operation. The covers are replaced in the reverse order to the order in which they were removed.

***IMPORTANT:*** Each cabinet, including the front cover, forms a shielded unit. Ensure to lock the cabinets while the system is running and replace the covers immediately following testing and maintenance.

1. Replace the covers starting with the lower cabinets.
2. Lock the top cover by turning the quick-release 90□ to the left or right (1) until the covers are firmly secured.

**CAUTION**

**Risk of injury from falling unlocked covers**
The covers are secure when you hear a click as you shut the cover. The cover may fall off if it is not locked into place.

3. Install the cover to the cable channel (see Figure 8 on page 230).

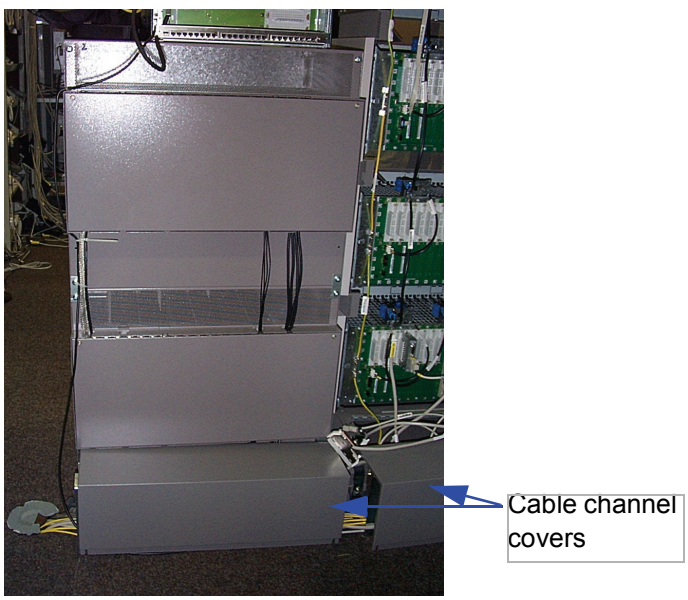



*Figure 8 Installing the cable channel covers*

# 13 Verifying the System

This chapter describes the tests and procedures used to verify the operation of the system.

## 13.1 Tools Required

***IMPORTANT:*** Each cabinet, including the front cover, forms a shielded unit. Ensure to lock the cabinets while the system is running and replace the covers immediately following testing and maintenance.

Use the following tools to perform the system verification procedures in this chapter:

- Maintenance telephone with a direct inward dialing (DID) number and direct trunk select capability enabled
- Telephone test set, P/N 66E3472 or 66E3924
- Transmission measuring test set (TMS) with singing return loss (SRL) and echo return loss (ERL) capability (SAGE 930A with options 01 and 10C), P/N 66E4280

***IMPORTANT:*** Perform the installation and testing procedures using the Hicom One Tool (HOT) or "HiPath 4000 Expert Access" (for a more detailed description of these procedures refer to the Online Help for the Hicom One Tool).

## 13.2 Checking the Boards

To check the status of the peripheral boards, use the selected software (such as HiPath 4000 Expert Access, in Europe). Peripheral boards are used in the line termination unit (such as SLMA2, RG, and LTUCA boards).

## 13.3 Checking the Cables

Check the assignment of the generated subscriber positions to the extensions. Test the functionality of trunk lines, tie lines, and special equipment.

1. Set up a tie-line (incoming/outgoing) and then initiate a consultation call.

   Forward the call.

2. Set up a trunk (incoming/outgoing) and then initiate a consultation call.
3. Forward the call.
4. Check the line statuses using the TAP (analog circuits, digital circuits and special circuits):
5. Ensure that the connected lines are in the **READY** state.

## 13.4 Checking and Testing the Features

To check the available features using the TAP and ensure that they are functioning correctly, refer to the operating instructions for the terminals and attendant console. Test all features for functionality.

A list of abbreviations can be found in the HiPath 4000 service manual under the AMO description FEASU.

## 13.5 Testing the Restart and Failure Transfer Function

Test the restart behavior and the failure transfer function of the system using the TAP.

1. Test soft restart
2. Test hard restart.

To test the failure transfer function of the system (only with an analog trunk):

1. Switch off the main power supply to the system.
2. Test the failure transfer function on the relevant customer device.
   - Is there a dial tone from the exchange?
   - Is it possible to dial the exchange?

   In the event of a power failure on the system, an analog trunk is switched on an analog device by means of a drop out relay.

3. After the test is complete, switch on the power to the system again (reload) and wait until it has started up.

## 13.6 Backing up the Customer Data

In order to be able to create a customer-specific hard disk as quickly as possible in the event of a hard disk failure, you must back up the PS program system for every customer.

---

***IMPORTANT:*** In HiPath 4000 systems without an MO drive, the program system (ACF) is backed up in the Flash Memory (":M:" drive).

---

## 13.7 Setting and Activating the HTS Function

With PABX Teleservice, service activities (for example, system maintenance, troubleshooting, and universal services) can be performed by means of the telephone network. This facility allows the product specialist to provide support remotely.

PABX Teleservice offers the following features:

- Remote maintenance
- Automatic fault reporting
- Software patches

The system has a standard HTS function. If the customer needs to use a HTS function:

1. Make the necessary hardware and software settings on the system (refer to the Service Manual description "Hicom Teleservice HTS").
2. Connect the modem for HTS to the V.24 port of the DSCXL module.
3. Set up the extension for HTS (extract from database).
4. Once you have made the required settings, activate and check the Teleservice function using the TAP.
5. Inform your control center about the new customer and initiate dial-up from the HTS console.

## 13.8 Checking the Ring Generator

To verify the ring generator, connect an ANATE to an SLMA port and dial the ANATE. If the ANATE rings like the normal U.S. cadence, it is functioning properly.

***IMPORTANT:*** If the ANATE telephone does not ring, check the ring generator settings.

**WARNING**

**Be extremely careful when working with the ring generator. High voltages are present at the ring generator.**

Ensure that the ring generator is jumpered as follows before powering on the system: 85 V, 20 Hz. To check this setting:

1. Ensure that the system is off.
2. Unscrew the screw that holds the ring generator in place.
3. Remove the ring generator.
4. On the backside of the ring generator, find a black plastic flap.
5. Check the setting.
6. Refer to the diagram on the ring generator for additional information.

## 13.9 Verifying the Station-to-MDF Connections

If the MDF cabling is performed by a subcontractor, verify and document all work as follows:

1. Check on the progress of the subcontractor’s work.
2. Issue or implement change orders to the subcontractor as needed.
3. Walk through the site to verify that the cabling has been completed according to guidelines, and either accept the work or write a list of the corrections to be made.

## 13.10 Verifying Transmission Facilities

This section describes the procedures used to verify CO and DID trunks, ISDN and T1 spans, and OPS lines and trunks.

### 13.10.1 Balancing Networks

To ensure optimum transmission performance, the TMC16, TMDID, and SLMA3 channels must be configured to the balance network that provides the best return loss (ERL and SRL). The balance network is configured by means of COFIDX field in the Direct AMO Dialog fast-path code (command) CHATCSU for TMDID, TMC16, and the NWBALNO field in command CHASCSU for OPS. A default value of 3 provides adequate performance for most trunk facilities, and OPS lines usually perform adequately with a default value of 2.

### 13.10.2 Choosing the Balance Network

For locally used trunks, the best balance network choice provides the highest ERL value that is equal to or greater than 10 dB, and an SRL low and SRL high that are equal to or greater than 10 dB. connotations

For facilities that are utilized within complex networks the best balance choice provides the highest ERL value that is equal to or greater than 18 dB and an SRL low and high that are equal to or greater than 10 dB.

---

***IMPORTANT:*** Do not select a balance network if the measured ERL value is less than either of the measured SRL values.

---

Table 1 shows various sample return loss measurements. In this example the best choice balance network would be network 3. Network 2 and 5 are acceptable for local trunks. Network 4 is not acceptable.

| Network | ERL (dB) | SRL Low (db) | SRL High (db) |
|---|---|---|---|
| 2 | 13.7 | 10.2 | 11.0 |
| 3 | 18.6 | 13.2 | 14.5 |
| 4 | 6.2 | 5.7 | 6.1 |
| 5 | 15.7 | 14.1 | 14.3 |

*Table 1 Return loss measurement examples (1)*

## 13.10.3 Selecting the Balance Network

***NOTE:*** Use this method only when more than one balance network meets the minimum criteria set previously in Section 13.10.2, "Choosing the Balance Network". Do not include balance networks if the measurements fall below any of the minimum level requirements.

If a trunk only meets or exceeds the minimum requirements on one balance network, then select that balance network but do not use this method.

To select a balance network:

1. Select a trunk.
2. Take the ERL and SRL measurements for all four networks on the selected trunk.

   ***IMPORTANT:*** Compare the four network measurements in each category.

3. Assign a quality factor rank (Q number 1 to 4) number, with 4 being the best return loss measurement. Ignore the trunk if any measurement falls below minimum requirements.
4. List the Q number for each balance network. Select the higher Q number total.

   In the event that two trunks have the same Q number total, select the network with the highest ERL measurement. If both trunks have the same ERL measurement, select the network with the highest SRL low measurement followed by the highest SRL high measurement.

   Network 3 (Table 2) shows an example of the best trunk balance network using the Q number method.

| Net-work | ERL (dB) | Q-No. ERL | SRL Low (db) | Q-No. SRL Low | SRL High (db) | Q-No. SRL High | Q-No. Total |
|---|---|---|---|---|---|---|---|
| 2 | 13.7 | 2 | 10.2 | 2 | 11.0 | 2 | 6 |
| 3 | 18.6 | 4 | 13.2 | 3 | 12.5 | 4 | 11 |
| 4 | 6.2 | | 5.7 | | 6.1 | | |
| 5 | 15.7 | 3 | 14.1 | 4 | 14.3 | 3 | 10 |

*Table 2 Return loss measurement examples (2)*

### 13.10.3.1 Balancing CO Trunks

To determine the best central office (CO) trunk configuration, perform the following:

1. Set the balance network in the trunk configuration to 2 as follows:

   a) Type the command `CHA-TCSU` and press **Enter**.

   b) Enter the following values and press **Enter** after each:

   | **Field** | **Value** |
   |---|---|
   | PEN1 | <LTG-LTU-SLOT-CIRCUIT> |
   | DEV | <GRDSTR or LPSTR> |
   | COFIDX | 2 |

   ***IMPORTANT:*** The angle brackets (< >) indicate fields that require trunk specific information.

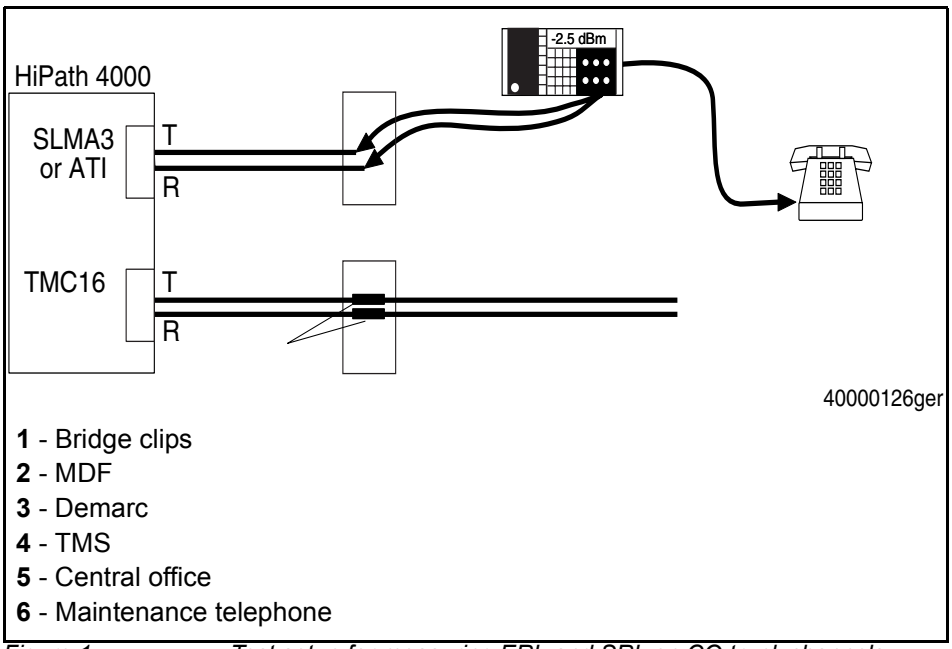
2. Activate the CO line to load the new balance network as follows:

   a) Type the command **`ACT-DSSU`** and press **Enter**.

   b) Enter the following values and press **Enter** after each:

   | **Field** | **Value** |
   |---|---|
   | ONTYPE | AUL |
   | TYPE | PEN |
   | PEN1 | <LTG-LTU-SLOT-CIRCUIT> |
   | PEN2 | <LTG-LTU-SLOT-CIRCUIT> |

3. Disconnect the maintenance telephone from the MDF block.
4. Connect the transmission test set to the maintenance telephone port (Figure 1).




**1** - Bridge clips
**2** - MDF
**3** - Demarc
**4** - TMS
**5** - Central office
**6** - Maintenance telephone

*Figure 1 Test setup for measuring ERL and SRL on CO trunk channels*

5. Verify that the TMS is in termination mode with 600-Ohm impedance.
6. Direct select the trunk under test by dialing # # 8 x x x.
7. Listen for CO dial tone. If you cannot get dial tone, ensure that it is not in use, and then perform the CO trunk signaling tests.
8. Dial the silent termination number of the facility provider.
9. Measure and note the ERL and SRL (low and high) values.
10. Repeat steps 1 through 9 of this procedure for balance network configurations 3, 4, and 5.

---

***IMPORTANT:*** In step 1, change COFIDX=2 in the command line to the correct balance network configuration number.

---

11. Configure the balance network in the trunk configuration that provided the best ERL and SRL values.

### 13.10.3.2 Balancing DID Trunks

To determine the best DID trunk configuration:

1. Set the balance network in the trunk configuration to 2 as follows:

   a) Type the command **CHA-TCSU** and press **Enter**.

   b) Type the following field values and confirm every input with **Enter**:

   | **Field** | **Value** |
   |---|---|
   | PEN | <LTG-LTU-SLOT-CIRCUIT> |
   | DEV | DID |
   | COFIDX | 2 |

2. Activate the DID line to load the new balance network as follows:

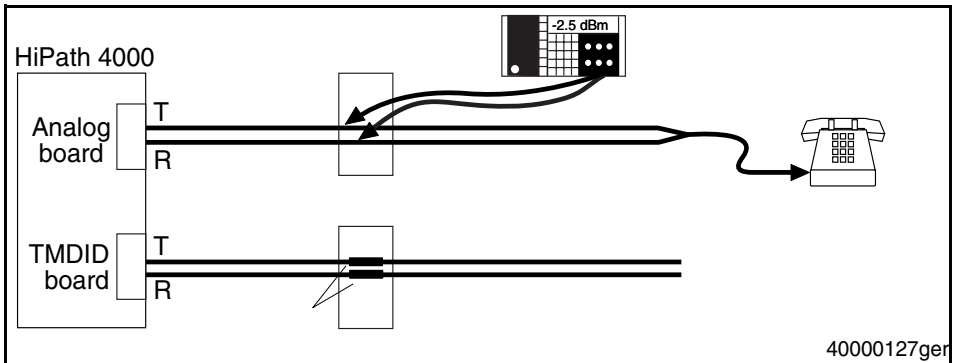
   a) Type the command **ACT-DSSU** and press **Enter**.

   b) Type the following field values and confirm every input with **Enter**:

   | **Field** | **Value** |
   |---|---|
   | ONTYPE | AUL |
   | TYPE | PEN |
   | PEN1 | <LTG-LTU-SLOT-CIRCUIT> |
   | PEN2 | <LTG-LTU-SLOT-CIRCUIT> |

   ***IMPORTANT:*** Steps 3 through 7 are not applicable to systems with hardware and symptom diagnosis (HSD).

3. Disconnect the maintenance telephone from the MDF block.
4. Connect the TMS to the maintenance telephone port (Figure 2).




**1** - Bridge clips
**2** - MDF
**3** - Demarc
**4** - TMS
**5** - Central office
**6** - Maintenance telephone

*Figure 2 Test setup for measuring ERL and SRL on DID trunk channels*

5. Ensure that the TMS is in terminated mode with 600-Ohm impedance.
6. Have the facility provider seize the DID trunk under test and then terminate it with silent termination.
7. Using the TMS, measure and note the value of the ERL and the SRL.
8. Repeat steps 1 though 7 for balance network configurations with the COFIDX set to 3, 4, and 5.
9. Configure the balance network in the trunk configuration that provided the best ERL and SRL values.

### 13.10.3.3 Balancing OPS Lines and Trunks

To determine the best OPS line configuration, perform the following:

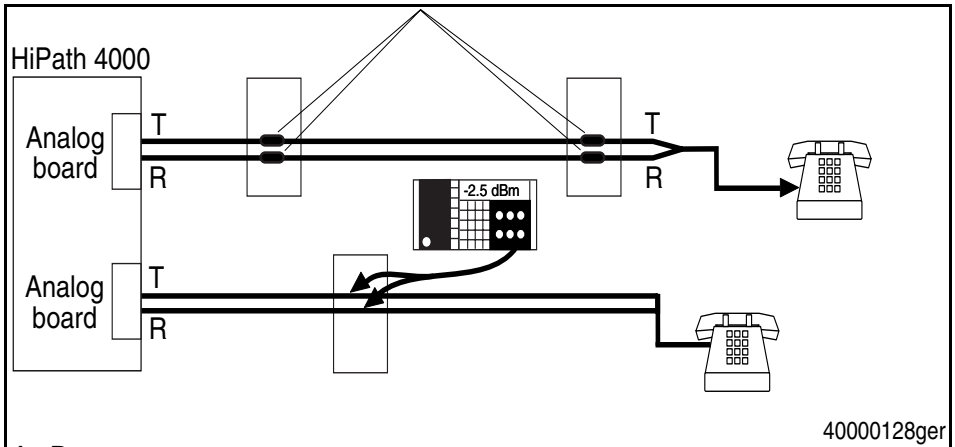
1. Set the balance network in the trunk configuration to 1 as follows:
   a) Type the command **CHA-SCSU** and press **Enter**.
   b) Type the following field values and confirm every input with **Enter**:

| **Field** | **Value** |
|---|---|
| STNO | <OPS extension #> |
| DEVFUNC | ANATE |
| COFIDX | 5 |

2. Activate the OPS line to load the new balance network as follows:
   a) Type the command **ACT-DSSU** and press **Enter**.
   b) Type the following field values and confirm every input with **Enter**:

| **Field** | **Value** |
|---|---|
| ONTYPE | AUL |
| TYPE | STNO |
| STNO | <OPS extension #> |

3. Disconnect the maintenance telephone from the MDF block.
4. Connect the TMS to the maintenance telephone port (Figure 3).




**1** - Demarc
**2** - Bridge clips
**3** - Transmission facilities
**4** - MDF
**5** - TMS
**6** - Maintenance telephone
**7** - Distant-end OPS telephone

*Figure 3 Test setup for measuring ERL and SRL on OPS lines*

5. Verify that the TMS is in termination mode with 600-Ohm impedance.
6. Call the OPS telephone.
7. Have the distant-end take the OPS telephone off-hook.
8. Measure and note the ERL and SRL (low and high) values.
9. Repeat steps 1 through 8 for OPS line configurations for balance network configurations 2, 3, and 4.
10. Configure the balance network in the line configuration that provided the best ERL and SRL values.

## 13.10.4 Verifying ISDN Spans

Verify the functionality of the D channel of the ISDN span as follows:

1. Ensure that the local continuity and the end-to-end link tests have been performed.
2. Ensure that personnel on the far end of the ISDN span have been assigned to perform this verification procedure with you.
3. Activate the DIU2U board as follows:

a) Type the command **ACT-BSSU** and press **Enter**.

b) Type the following field values and confirm every input with **Enter**:

| Field | Value |
|---|---|
| ONTYPE | AUL |
| LTG | <LTG> |
| LTU | <LTU> |
| SLOT | <SLOT> |

4. Activate the D channel of the ISDN span as follows:

a) Type the command **ACT-DSSU** and press **Enter**.

b) Type the following field values and confirm every input with **Enter**:

| Field | Value |
|---|---|
| ONTYPE | AUL |
| PEN | <PEN of the D channel> |

5. Activate all the bearer channels of the ISDN span as follows:

a) Type the command **ACT-DSSU** and press **Enter**.

b) Type the following field values and confirm every input with **Enter**:

| Field | Value |
|---|---|
| ONTYPE | AUL |
| PEN | <PEN1><PEN2> |

The D channel becomes operational within 15 seconds.

If the D channel is not operational within 15 seconds after activation, check the configuration for the different types of applications in Table 3 through Table 6.

---

***IMPORTANT:*** Record the device type and bipolar eight substitution information.

---

| BCSU Parameters | If the near end is | The far end should be |
|---|---|---|
| Timing type (TIMTYP) | SYST | LOOP |
| Frame (FRAME) | STD | STD |
| Bipolar eight substitution (BI8SUB) | YES | YES |
| Bipolar violation detection | YES | YES |
| Network or user emulation (NETUSR) | NETWK | USER NETWK |

*Table 3 BCSU configuration checks for CorNet trunks*

| TCSU Parameters | If the near end is | The far end should be |
|---|---|---|
| Device type (DEV) | S1D<br>S1B | S1D<br>S1B |

*Table 4 TCSU configuration checks for CorNet trunks*

| BCSU Parameters | Near End |
|---|---|
| Timing type (TIMTYP) | LOOP |
| Frame (FRAME) | <STD or ESF> (Must be the same as the far-end configuration.)<br>If the frame = ESF, check the bipolar eight substitution (BI8SUB) value. |
| BI8SUB | <NO or YES> (Must be the same as the far-end configuration.) |
| Bipolar violation detection | <NO or YES> (Must be the same as the far-end configuration.) |
| Network or user emulation (NETUSR) | USER |

*Table 5 BCSU configuration checks for AT&T, MCI, and SPRINT ISDN trunks*

| TCSU Parameters | Far End |
|---|---|
| Protocol (PROTOCOL) | <ATT49, ATT59 or MCI for SPRINT and MCI2 for MCI> (Must be the same as the far-end configuration). |

*Table 6 TCSU configuration checks for AT&T, MCI, and SPRINT ISDN trunks*

***IMPORTANT:*** If all of the configurations are correct and the D channel is still not operational, contact your next level of support.

## 13.10.5 Verifying T1 Spans

To verify T1 spans:

1. Activate the DIU2U board as follows:

   a) Type the command **ACT-BSSU** and press **Enter**.

   b) Type the following field values and confirm every input with **Enter**:

   | **Field** | **Value** |
   |---|---|
   | ONTYPE | AUL |
   | TYPE | PEN |
   | PEN1 | <PEN1> |
   | PEN2 | <PEN2> |

2. Activate all the channels of the span as follows:

   a) Type the command **ACT-DSSU** and press **Enter**.

   b) Type the following field values and confirm every input with **Enter**:

   | **Field** | **Value** |
   |---|---|
   | ONTYPE | AUL |
   | TYPE | <PEN> |
   | PEN1 | <PEN1> |
   | PEN | <PEN2> |

3. Ensure that the local continuity and the end-to-end link tests have been performed.

4. Perform a bit error rate test (BERT). Should the BERT fail, contact your local provider.

5. Display the current link error count of the T1 span as follows:

   Type the command **DIS-BSSU** and press **Enter**. Repeat this action several times.

   | **Field** | **Value** |
   |---|---|
   | LTG | 1 |
   | LTU | <LTU> |
   | SLOT | <SLOT> |
   | CCTNO | <blank> |
   | DIS-TYPE | <blank> |
   | RESET | <blank> |

   After 15 seconds, the T1 span enters the green alarm state and the following errors stop increasing:

   - Bipolar error seconds (BES)
   - Out-of-frame error seconds (OES)
   - Up slips (US)
   - Down slips (DS)
   - Error seconds (ES)

- Frame slips (FS)

If the T1 span enters the green alarm state but the errors are increasing, perform a BERT.

### 13.10.6 Recording Circuit IDs

Record circuit IDs in the Jack and Pin Record Data Sheet of the *Siemens 9751 CBX and 9200 CBX System Site Log*.

## 13.11 Verifying the MO-Disk Drive

Verify the operation of the MO-disk drive by checking its status as follows:

1. Type **`DIS-DSSM`** and press **Enter**.
2. Type the following values, then press **Enter**.

| **Field** | **Value** |
|---|---|
| UNIT | A1 |
| TYPE | C |
| CNO | 6 |

## 13.12 Verifying the Hard Disk

Verify the hard disk as follows:

1. Check the status of the hard disk drive as follows:
   a) `Type` DIS-DSKST **and press** Enter.
   b) Enter the following values and press **Enter** after each:

| **Field** | **Value** |
|---|---|
| UNIT | <A1, V1, T1> |
| TYPE | C |
| CNO | <1 - 8> |

   The screen displays `IN SERVICE`.
2. If the drive is not ready, repeat steps 1a and 1b, and proceed to the following steps:
   a) Enter the command `ACT-DSKX` and press **Enter**.
   b) Enter the following values and press **Enter** after each:

| **Field** | **Value** |
|---|---|
| UNIT | <A1, V1, T1> |
| CNO | <1 - 8> |

3. If the hard disk does not activate, perform steps 5 through 10 in Section 13.11, “Verifying the MO-Disk Drive”.

## 13.13 Verifying the Operation of System Features and Servers

This section provides test procedures to verify the operation of the HiPath 4000 system features and servers.

### 13.13.1 Testing CDR

Test the call detail recording (CDR) list output of the system as follows:

1. Print the following information by typing the commands shown in Table 7, one at a time.

| Command | Information to Retrieve |
|---|---|
| DIS-MSEL | Operating condition, basic device (BASDEB), STNTBL1, and DNOTBL1 |
| DIS-MLIST | Station number |
| DIS-MFREQ | DIALOGFIELD |

*Table 7 CDR reports to retrieve*

2. From the DIS-MSEL printout, select a selection group that has OPERATION CONDITION = ON.
3. If STNTBL1=N, and DNOTBL1=N, then all stations are valid for CDR. If STNTBL1=Y, and DNOTBL1=Y, find valid stations for CDR from the command DIS-MLIST printout.
4. If BASDEV=DEV#, then the CDR must be sent to a printer or a terminal (depending on the configured device on port 1 of the ADP).
5. Make an external call from any valid station. The CDR must be sent either to a printer or to a terminal when the call is completed.
6. If BASDEV=CDRC1 or (CDRC2), then the CDR must be sent to a file. From the FCP `DISMFREQ` printout, if at least one dialog field number exists, establish an external call from any valid station.
7. Type the command `DIS-MFREQ` and then press **Enter**.
8. Type the field value `DIAFNO=<dialog field #>`, and then press **Enter.**
9. The CDR must be sent to a file.
10. If the dialog fields are free in the `DIS-MFREQ` command printout: type the command `ADD-MFREQ` and press Enter**.**

11. Type the following field values and confirm every input with Enter:

| Field | Value |
|---|---|
| TYPE | L |
| DIAFNO | 1 |
| FILE | CDRC1 |
| FILESTA | <YYMMDDHHmm> |
| FILEND | <YYMMDDHHmm> |
| FORMFORM0 | 2 |
| BLKSIZE | 127 |
| FOUT | Y |
| STAT | YYMMDDHHmm> |
| MULTOUT | N |
| PERIOD | 0 |
| SELSTOP | Y |

12. Make an external call from any valid station.
13. Type the command `OUT-MFREQ` and press **Enter**.
14. Type the field value `DIAFNO=<1>` and then press **Enter**.
15. When the CDR test is finished, type the command `DEL-MFREQ` and press **Enter**.
16. Type the field value DIAFNO=<l> and then press **Enter**.

## 13.13.2 Testing Least-Cost Routing

Test the least-cost routing (LCR) configuration of the system after all of the outgoing trunks have been cut over and tested as follows:

1. Print the reports in Table 8.

| Command | Parameters to Set | Information to Retrieve |
|---|---|---|
| DIS-LROUT | | Trunk group numbers and route numbers |
| DIS-LDPLN | | Dialing patterns and route numbers |
| DIS-LSCHD | | LCR schedule |
| DIS-LAORT | | Area code and office code restrictions |
| DIS-LCOS | | LCR classes of service |
| DIS-DPLN | TYPE=STN | ROLMnet dialing patterns and route numbers |
| DIS-TGACC | | PEN locations of trunk circuits |

*Table 8 LCR reports to retrieve*

2. Select a dialing pattern from the Dialing Patterns and Route Numbers report.
3. Note the route number that is associated with the selected dialing pattern.
4. Note the first trunk group (route element) associated with the route number in the Trunk Group Numbers and Route Numbers report.

5. Ensure that the trunk group is available to test as follows:

   a) Check the LCR schedule report to ensure that the LCR schedule presently allows access to the selected route element. (Look at the Trunk Group Numbers and Route Numbers report and note the letters under the SCHEDULES field that have been marked with an X. Use these letters as an input to the LCR schedule report.)

      If the schedule blocks a call to that trunk group, change the system date and time to comply with the schedule, by typing the command `CHADATE`.

   b) Check for a READY status of the actual trunk circuits in that group by typing the command `DIS-SDSU-TK` with the PENs found in the PEN locations of the trunk circuits report.

   c) Check the AUTH field of the Trunk Group Numbers and Route Numbers report to ensure that the LCOS for the maintenance extension is high enough to use that route by typing the command `DIS-SCSU` to find the LCOSV of the maintenance extension.

   d) Check the AORT field of the Trunk Group Numbers and Route Numbers report to ensure that the test number does not contain an area code or office code that is blocked for that route. Use the AORT index number from the Trunk Group Numbers and Route Numbers report in the DIS-LAORT report to check this.

6. Dial a far-end test number that incorporates the selected dialing pattern. Ensure that the call is complete.

7. Ensure that one of the trunks in the trunk group was seized by call processing, by typing the command `DIS-SDSU` with the PENs found in the PEN Locations of Trunk Circuits report. The initials CP should appear in the status field.

8. Deactivate the trunk group by typing the command `DEADSSU` with the PENs found in the PEN Locations of Trunk Circuits report.

9. Repeat steps 4 through 8 with the remaining route elements (trunk group) in the route.

10. Repeat steps 3 through 9 with the remaining dialing patterns in the Dialing Patterns and Route Numbers report.

11. Repeat steps 2 through 9 with a ROLMnet extension from each route found in the ROLMnet Dialing Patterns and Route Numbers report.

12. If the date and time were changed in step 5a, reset them to their correct values.

## 13.14 Verifying the System Bypass

Verify the system bypass as follows:

1. Check the punch down sequence of the DSCXL board.
2. Refer to the HiPath 4000 Service Manual for the SSD information on the DSCXL board to check whether the system bypass is functioning properly.

## 13.15 Customer Training, I.M.

Once the system is fully operational, the following basic training is to be provided for each system.

- Basic introduction to the HiPath 4000 system for a person nominated by the customer.
- Explanation of the functionality and performance of the attendant console (operation of the attendant console)
- Functionality of the Chese (Executive/Secretary service) in hard-coded and freely-programmable keys.
- Introduction to the digital console including the team function, which is available in hard-coded and freely-programmable keys.

The customer is responsible for nominating the participants in the basic training. The number of participants is limited to 2-4 persons.

# 14 Adding Cabinets to the System

This section describes procedures to add cabinets to the HiPath 4000.

## 14.1 Expansion Configuration

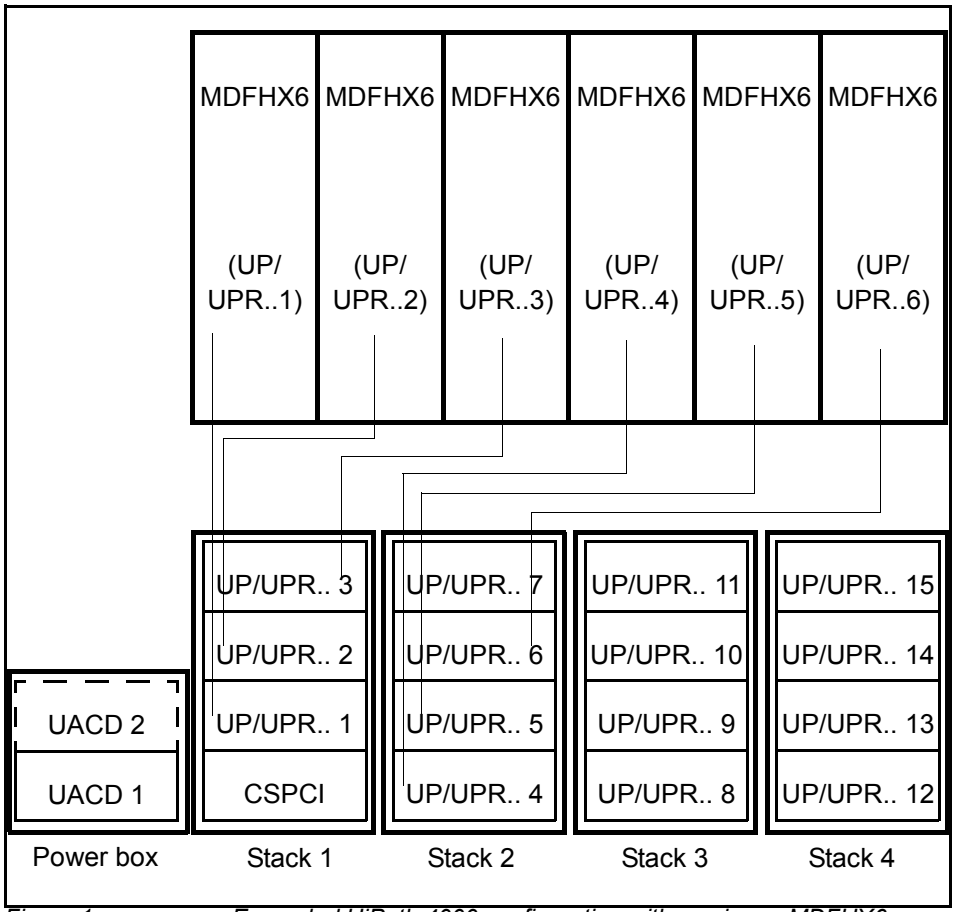



*Figure 1 Expanded HiPath 4000 configuration with maximum MDFHX6 number*

The expansion cabinets in a multiple-cabinet system (maximum four cabinets) are on top of the basic (CC80F) cabinet. The expansion cabinets are secured together using quick-release locks on the front.

To expand the system:

---

***NOTE:*** The connecting screws between the individual cabinets are not used for internal grounding purposes.

---

1. Release the cabinet by turning the quick-release locks 90□ to the left or right (see Figure 2).
2. Lift the housing cover off the base cabinet.

---

***IMPORTANT:*** The housing cover and backplane are also secured in the same manner as the expansion cabinets. This allows components to be removed individually after the quick-release locks have been released.

---

3. Mount the expansion cabinet on top of the existing expansion cabinet.
4. Secure with screws.
5. Refer to the hardware to connect the telephony cables.

*Figure 2 Removing system components*

## 14.2 Connecting the Cabinet Stacks

To connect the cabinet stacks, refer to Section 6.2.2, “Installing the Ground Straps Between Cabinets”

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