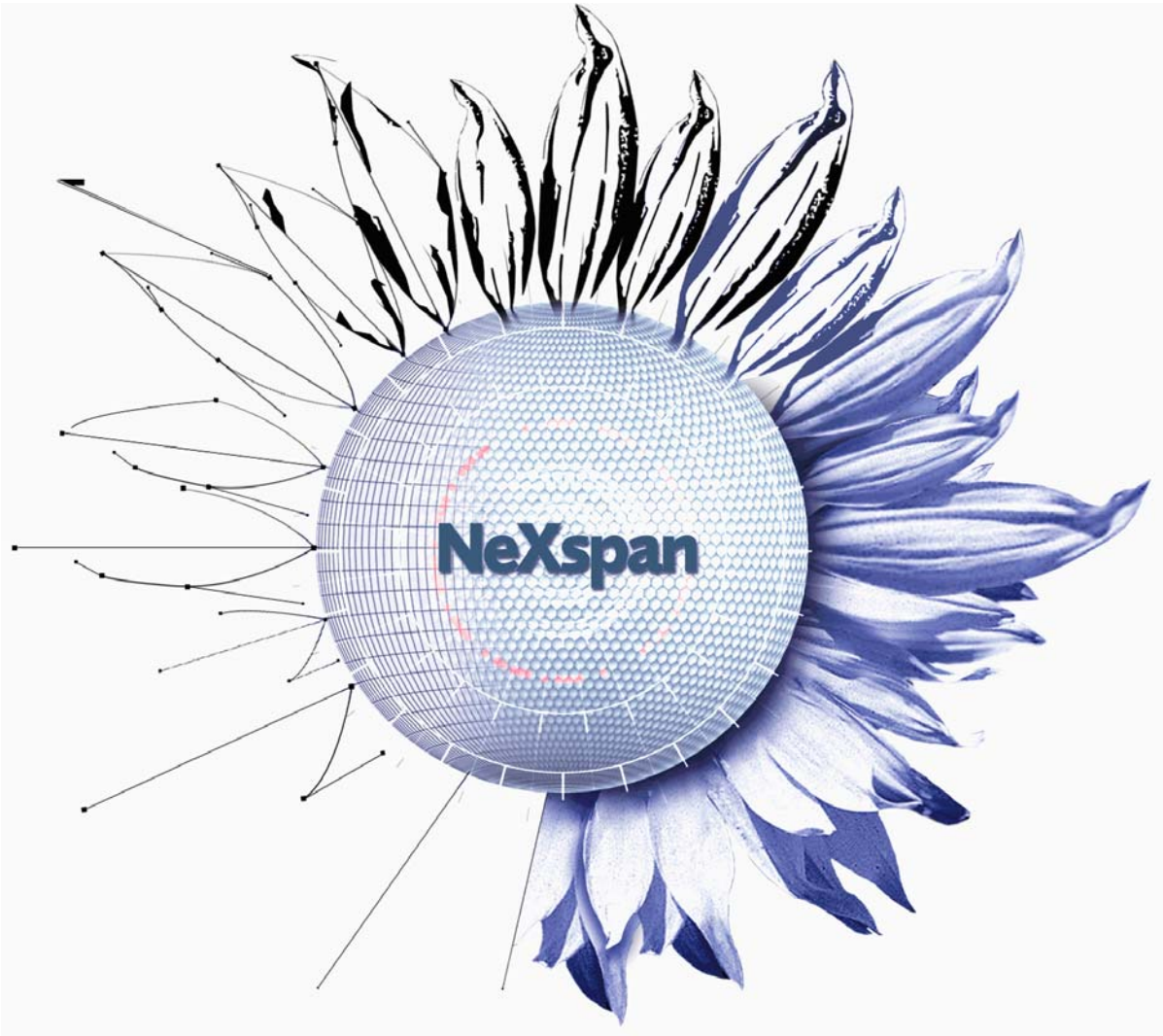


Integrated DECT Service

Installation guide

NeXspan C/S/L/D - NeXspan 50 - NeXspan 500

AMT/PTD/PBX/0020/2/4/EN

01/2007

AASTRA

TABLE OF CONTENTS

Chapter 1 - Introduction

1.1 Object

This document describes how to install and put in service the integrated DECT service for the following PBXs:

- NeXspan C/S/L/D
- NeXspan 50
- NeXspan 500

This document is divided into 10 chapters:

Chapter 1: Introduction

This chapter gives the contents of the document, a list of the abbreviations used and the definition of concepts specific to the DECT. Should you require more detailed information, a "Reference Documents" section gives the references and titles of other manuals you can consult.

Chapter 2: Description

This chapter describes the physical equipment making up the integrated DECT system (base stations and mobiles).

Chapter 3: Deployment principles

This chapter describes the deployment method for a given installation, i.e. definition of the radio coverage, the number of base stations and the dimensioning of the system.

Chapter 4: Implementation of hardware on NeXspan C/S/L/D

This chapter describes the interface cards to be used in an NeXspan C/S/L and the wiring layout between the system and the DECT base stations.

Chapter 5: Implementation of hardware on NeXspan 50

This chapter describes the interface cards to be used in a NeXspan 50 and the wiring layout between the NeXspan 50 and the DECT base stations.

Chapter 6: Implementation of hardware on NeXspan 500

This chapter describes the interface cards to be used in a NeXspan 500 and the wiring layout between the NeXspan 500 and the DECT base stations.

Chapter 7: Multi-site synchronization

This chapter describes the principles and specific features of synchronization for multi-site networks.

Chapter 8: Checking the installation

This chapter describes the preliminary operations common to both the NeXspan C/S/L/D, NeXspan 50 and NeXspan 500 ranges before the DECT installation is programmed and put in service.

Chapter 9: Programming for the NeXspan C/S/L/D range

This chapter describes the programming steps to put in service the integrated DECT service for NeXspan C/S/L./D

Chapter 10: Programming for the NeXspan 50/NeXspan 500 range

This chapter describes the programming steps to put in service the integrated DECT service for NeXspan 50 and NeXspan 500 PBXs.

Chapter 11: Multi-site programming

This chapter describes the specific programming steps to put in service the integrated DECT service for a multi-site network.

1.2 Audience

This document is for installers whose tasks are to:

- carry out a study into positioning base stations, and system traffic flow,
- connect base stations to the distribution frame,
- start up and put the DECT system in service.

1.3 Reference documents

[1] DECT standards (ETSI standards):

- ETS 300-175: Digital European Cordless Telephone Common Interface
- ETS 300-176: Digital European Cordless Telephone approval test specification
- ETS 300-444: Digital European Cordless Telephone General Access Profile

[2] Electromagnetic compatibility:
System components comply with the following safety and electromagnetic compatibility recommendations:

- ETS 300-329 : Radio Equipment Systems; Electromagnetic Compatibility for Digital Enhanced Cordless Telephone.
- EN 60950 : Security of data processing equipment
- EN 50081-1 : Electromagnetic Compatibility - Transmission.
- EN 50082-1 : Electromagnetic Compatibility - Immunity.

[3] M900 M901 M902 User Guide PS8348*

[4] Operating manual NeXspan C/S/L/D - Volume 1 (AMT/PTD/PBX/0046*)

[5] Operating manual NeXspan C/S/L/D - Volume 2 (AMT/PTD/PBX/0052*)

[6] Operating manual NeXspan C/S/L/D - Volume 3 (AMT/PTD/PBX/0053*)

[7] Installation manual - Clusters, boards and terminators - NeXspan 50 - R4.1 release (AMT/PTD/PBX/0027*)

[8] Installation manual - NeXspan 50 - R4.1 release (AMT/PTD/PBX/0028*)

[9] Installation manual - Clusters, boards and terminators - NeXspan 500 - R4.2 release (AMT/PTD/PBX/0030*)

[10] Installation manual - NeXspan 500 - R4.2 release (AMT/PTD/PBX/0031*)

[11] Operating manual NeXspan 50 - Volume 1 (AMT/PTD/PBX/0008*)

[12] Operating manual NeXspan 50 - Volume 2 (AMT/PTD/PBX/0009*)

[13] Operating manual NeXspan 50 - Volume 3 (AMT/PTD/PBX/0010*)

[14] Operating manual NeXspan 50 - Volume 4 (AMT/PTD/PBX/0011*)

[15] Operating manual NeXspan 50 - Volume 5 (AMT/PTD/PBX/0012*)

[16] Installation and Maintenance Manual - NeXspan C/S/L/D Range (AMT/PTD/PBX/0058*)

[17] M910/M915 User's guide (AMT/PUD/PTD/0001*)

[18] M920 M921 M922 User Guide (PS10419*)

1.4 Abbreviations

AC	Authentication Code
ADPCM	Adaptative Differential Pulse Code Modulation
ARI	Access Right Identity
DCK	DECT Ciphering Key
CRC	Cylic Redundancy Checking
DECT	Digital Enhanced Cordless Telecommunications
EIC	Equipment Installation Code
EMC	Equipment Manufacturer Code
F1	PBX range including M6501 R/L IP PBX, M6501 RM IP PBX and Succession 6500 Media Gateway
F2	M6540 IP PBX range
F4	PBX range including MC6530, MC6530E, MC6550, and M6550 IP PBX, NeXspan 50 and NeXspan 500
F6	PBX range comprising NeXspan D (XD), NeXspan L (XL), NeXspan S (XS) and NeXspan C (XC)
FPS	Fixed Part Subnumber
GAP	Generic Access Profile
IPEI	International Portable Equipment Identity
IPUI	International Portable User Identity
LAL	Location Area Level
PLL	Permanent Logical Link
PARI	Primary ARI
PARK	Portable Access Right Key
PARK{y}	PARK with PLI y
PBX	Private Branch eXchange
PLI	Park Length Indicator
PSN	Portable Serial Number
PUN	Portable User Number
PUT	Portable User Type
RFPI	Radio Fixed Park Identity
RPN	Radio Port Number
RSSI	Radio Signal Strength indicator
SARI	Secondary ARI
UAK	User Authentication Key
UCT1	Central processing unit card 1st generation
UCT2	Central processing unit card 2nd generation

1.5 Definitions

1.5.1 Definitions concerning deployment

- Coverage area

The coverage area refers to the space within which the user of a mobile must be able to transmit and receive calls. This area can include coverage both inside and outside a building.

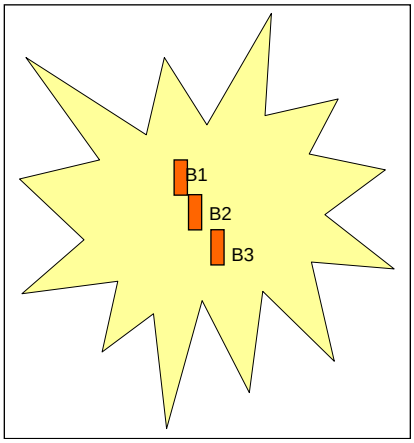
- Base station

The base station is made up of an omnidirectional transceiver. The base station radio coverage area (called a "radio area") is, in free space, spherical and centered on the base station. A base station must belong to a trunk group (in the MMCs).

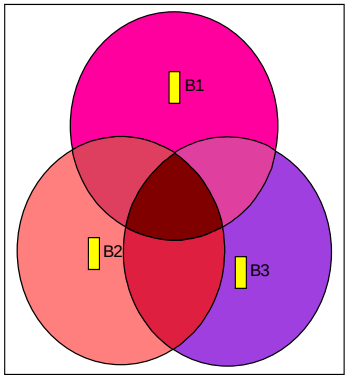
- Overlapping base stations

Base stations with the same radio coverage (3 base stations maximum). Each base station manages a certain number of mobiles, depending on their distribution.

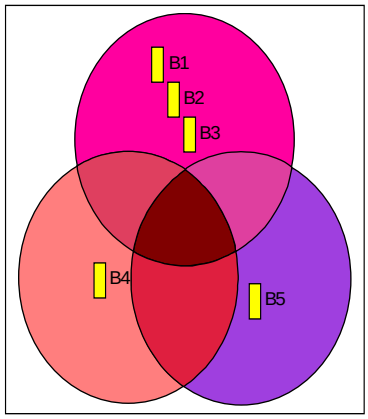
- Examples:
  case 1: B1, B2, and B3 are remote base stations located 30 to 50 cm from each other. They constitute a single radio area. At any location within the radio area, a cordless handset sees the three base stations with the same radio level. This configuration corresponds to three base stations located in the same area.



- case 2: ¨B1, B2, and B3 are base stations, each with its own radio area. Each time a cordless handset is located at the intersection of these three areas, it recognises the three base stations with the same radio level.

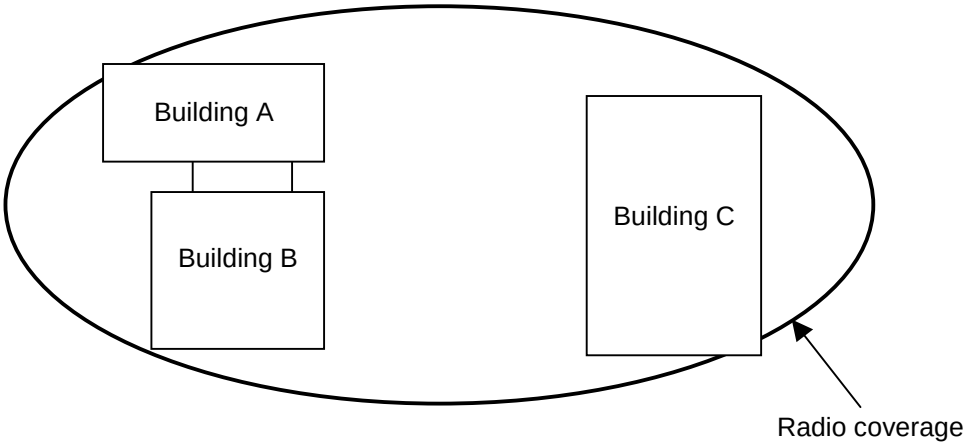


- case 3: B1, B2, and B3 are remote base stations located 30 to 50 cm from each other. They constitute a single radio area. B4 and B5, are base stations, each with its own radio area. Each time a cordless handset is located at the intersection of these three areas, it recognises the five base stations with the same radio level.



- Radio coverage:

The radio coverage of a site is the area where a cordless handset user must be able to transmit and receive calls. Radio coverage can be indoors or outdoors, and on a horizontal or vertical plane.



- Radio area:

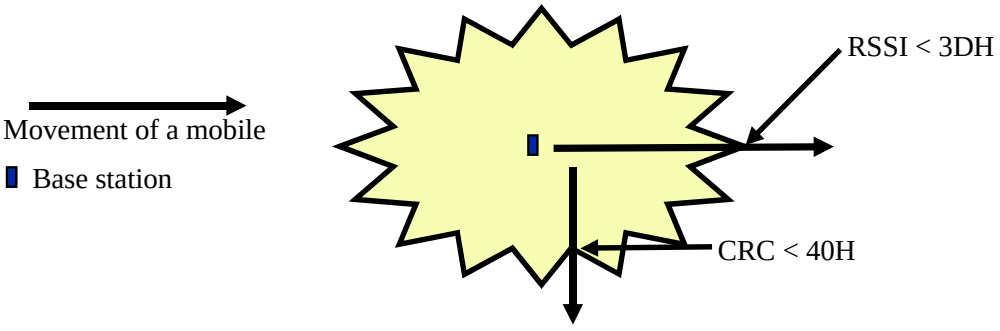
The radio area is the basic element in radio coverage. The radio area is the zone in which a base station transmits and receives signals. However, depending on the traffic conditions (number of simultaneous calls required within the same office), it may be necessary to install multiple base stations adjacent to one another covering virtually the same radio area. In this case, they are referred to as overlapping base stations. The size of each radio area varies according to the topology.

The limits of a radio area correspond to the limits of the radio range of the base station in the radio area. These limits are determined by the following two criteria:

1. Indicator of error rate in the transmission of the radio signal (CRC). The value of this indicator must be 40H. If its value is lower, the limit of the radio area is reached.

2. The radio signal strength indicator (RSSI). If this level drops below 3DH while the CRC is still at 40H, the limit of the radio area is reached.

Example:



- Radio area centre

Location of a base station or antenna serving a radio area.

- Radio range

The distance between the radio area centre and its perimeter. The radio range depends on the environment.

- Trunk group (in the DECT sense):

A group of base stations (8 maximum). A trunk group must be associated with a cell. Note that the notion of a DECT trunk group used here is different from that usually associated with a PBX.

- Cell

The cell, to the PBX, represents a set of base stations. It constitutes the basic mobile roaming entity. The PBX recognizes the cell in which a given mobile is located and not the radio area (that is, the base station on which the mobile is locked). When the PBX sends a message to a mobile, it broadcasts it to all base stations in the cell. Consequently, a cell generally represents a homogeneous space.

One cell contains a maximum of 8 base stations. For an initial installation, the recommendation is to limit the number of base stations to between 4 and 6 per cell, to allow for future expansion.

- Roaming:

mechanism for changing the channel for a cordless handset during communication or when no call is set up (roaming).

- Handover:

mechanism for changing the base station during communication.

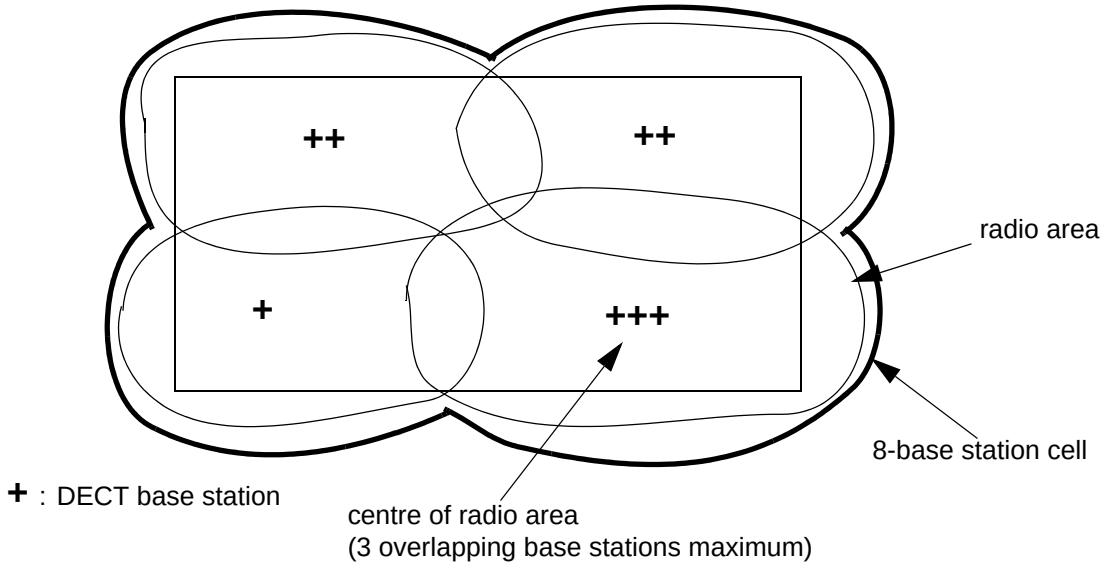


Figure1: Example deployment

1.5.2 Overlapping radio areas

The radio coverage of a site is established by positioning basic radio areas next to each other. However, to guarantee quality of service for the entire site, the radio areas must overlap on the horizontal and vertical axes. This overlap is required so the roaming and handover phases take place in good radio conditions.

During deployment you must measure the significant values (CRC/RSSI) of the radio area studied and note them on the site plan. These measurements must be taken on the horizontal and vertical axes. The six measurements must indicate the following three values: the CRC, the RSSI, and the distance between the point where the measurement was taken and the base station concerned.

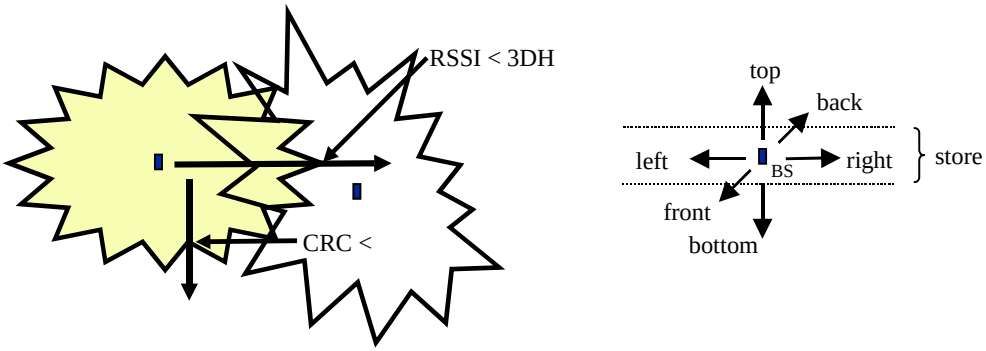


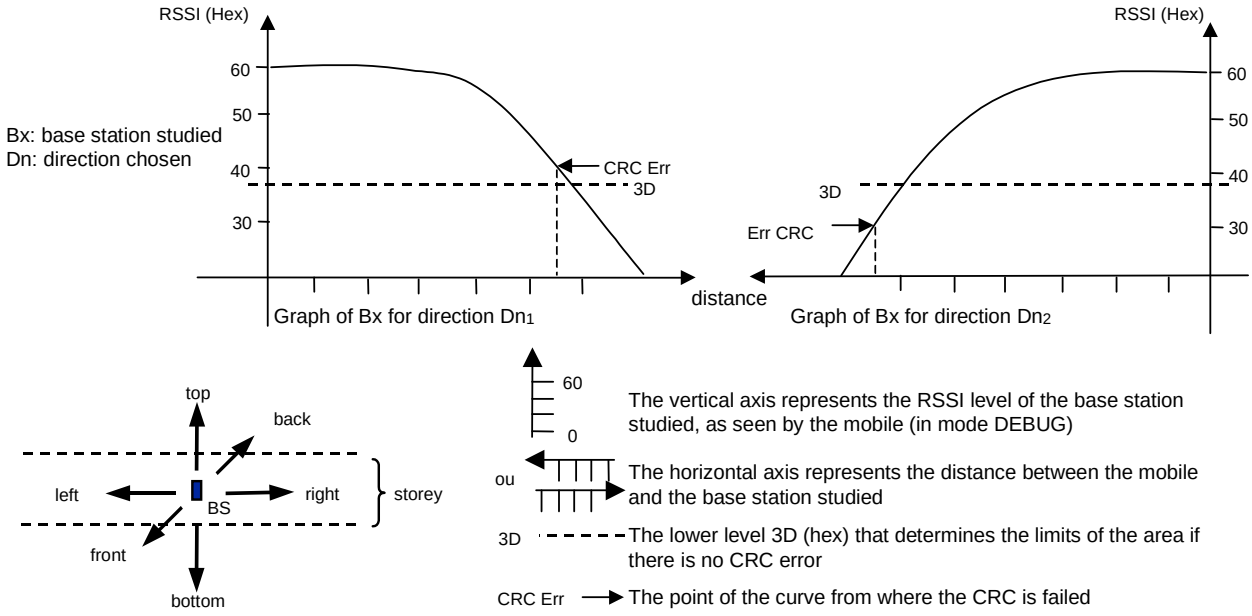
Figure2: Overlapping radio areas

Examples of representation of these measurements:

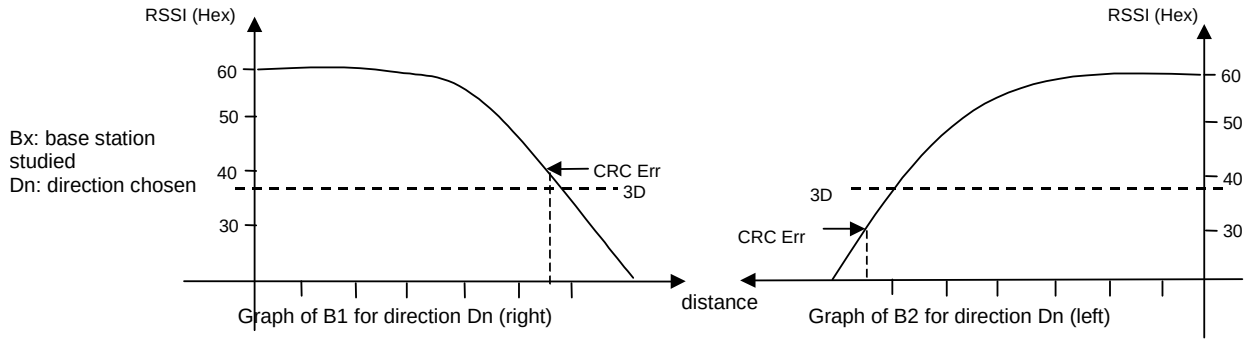
The graphs below show the change in the RSSI level according to the distance from the base station studied. The graphs are linked to the chosen direction. To determine whether the overlap of the two radio areas is correct, you must have the two measurements in both directions for the plan concerned (for example on horizontal axle of base station 1, right direction – base station 2, left direction). The graphs are shown side by side to be able to check that the intersection point of the two curves is situated above the lower level (3DH) of the area limit. It is also necessary to make sure that the CRCs of each curve are on each side of the intersection point.

These conditions allow you to ensure quality of service for roaming and handover.

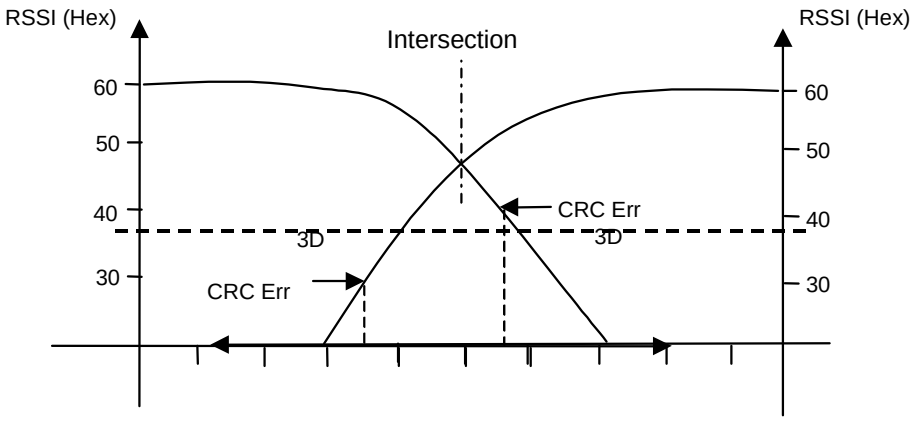
- Case of theoretical limits



- Case of two base stations without handover



- Case of two base stations with handover



1.5.3 PARI/SARI management (mobile access rights)

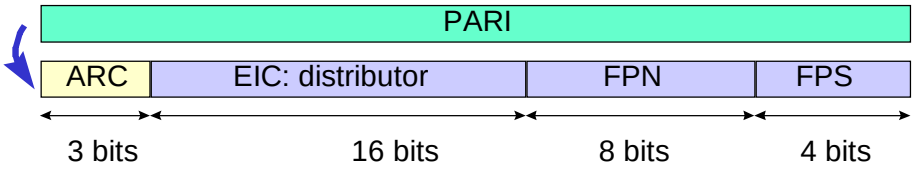
The ARI (Access Right Identity) is a 31-bit sequence, unique for each DECT network. ARI is used for access rights management for all DECT terminals using the network via the base stations.

The PARI (Primary ARI) is an ARI number assigned to a user. It consists of 3 elements:

- ARC, Access Right Class. Radio communication standard used by the PBX (e.g. B class multi-cellular PBX).
- EIC, Equipment Installation Code: distributor reference (example: AASTRA) managed by the ETSI.
- FPN + FPS, Fixed Part Number and Fixed Part Sub-number. Network user reference (AASTRA customer) or PBX reference (see below), managed by AASTRA.

The PARI is transmitted to the mobiles in encoded format by the base station.

PARI: identity of the DECT network user or MC 6500 user



RFPI: identity of the radio base stations

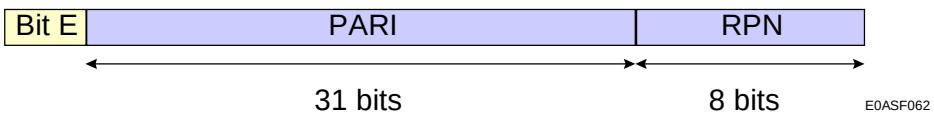


Figure3: PARI/SARI management

The SARI (Secondary ARI) is a secondary ARI number that enhances the PARI. The SARI, when it exists, is generated by the base station.

The PARK (Portable Access Right Key) is the number associated with a PARI or SARI registered in the cordless handset during initial identification on the DECT network. To avoid locking onto a base station on which it is not authorised, the mobile possesses the PARK{y} information item, containing the first y significant bits of the ARI (PARI or SARI) used to encode the right of access. This information is loaded into the mobile when it registers.

FOR A SINGLE-SITE PBX MANAGING LESS THAN 32 CELLS:

A single PARI assigned to all the base stations is provided by AASTRA. Authorization access is performed by testing the PARK registered in the mobiles which must correspond to the PARI.

FOR A MULTI-SITE PBX WITH GLOBAL ACCESS (each mobile has access to the entire multi-site network):

Each PBX has the same PARI(s). Multi-site base station access is by a common SARI. Access authorization is performed by testing the PARK registered in the mobiles. The PARK must correspond to the SARI.

FOR OTHER MULTI-SITE CONFIGURATIONS:

Please contact AASTRA (ask for the "pre-sales" engineer).

1.5.4 Constructing the authentication key

The User Authentication Key (UAK) is generated separately for the mobile and the PBX during registration, using the DSAA (DECT Standard Authentication Algorithm). The following data is used to generate the key:

- the authentication code (AC), a concatenation limited to 4 digits of the directory number plus the installer’s password,
- the Random-f number, a sequence of up to 10 digits,
- the RS number, a sequence of up to 10 digits.

The AC is calculated by the PBX when the terminal is declared in the system, and must be manually introduced into the mobile before the mobile registration request is made.

Chapter 2 - Description

2.1 Description

The integrated DECT is designed to operate with NeXspan C/S/L/D, NeXspan 50 and NeXspan 50.

The DECT system contains the following components:

- the mobile set which enables the user to use PBX telephony features
- the base station which provides radio coverage for a given area and supports four simultaneous calls. In addition, the base stations are equipped with "antenna diversity", a feature that ensures optimal reception quality within the coverage area. The number of radio base stations used depends on the size of the coverage area and the level of traffic supported. Only after carrying out a site radio survey is the number of base stations determined, to ensure complete coverage for each site. Connecting a DECT base station to an S0 access voids the possibility of connecting any other ISDN equipment via the same access (point-to-point bus).
- DECT interface card: the base station is connected to the PBX via an S0 link for 2-channel or 4-channel base stations.

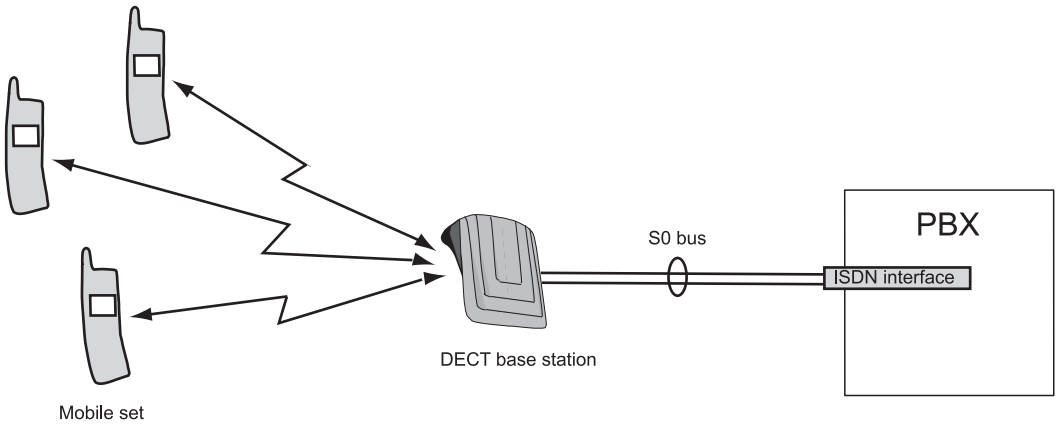


Figure 2-1: DECT base station - PBX connection

2.2 DECT radio base stations

2.2.1 Physical description

A DECT base station consists of a plastic housing and an electronic card. The electronic card manages the ISDN interface. One radio module mounted on the card manages the radio interface. A DECT base station is equipped as standard with two quarter-wave antennas integrated into the unit. To obtain polarization diversity, one is horizontal and the other vertical.

Note: *You are advised against repainting the housing without written consent from manufacturer.*

In release 3.2 and later, a new base station may be installed on any F4 and F6 device. The new base station is physically identical to the old M6241 base station. Only obsolete components of the electronic card are replaced.

BS (Base station)	Reference
Old M6241 base station	RB1734E
New M6241 base station	RB1831A

Table 1: DECT base station references

Sealed unit for outdoor base station

Installation of base stations outdoors without a sealed unit is prohibited:

- sealed unit (reference HR1738A) for installing a base station without external antenna.
- securing kit (reference HR1755A) for mounting the sealed unit on a post.

Mounting the base station

Base stations must be installed vertically. Remove the base station housing by sliding it upwards. Attach the base station to the wall using two screws, respecting the necessary distances between the base stations and any obstacles.

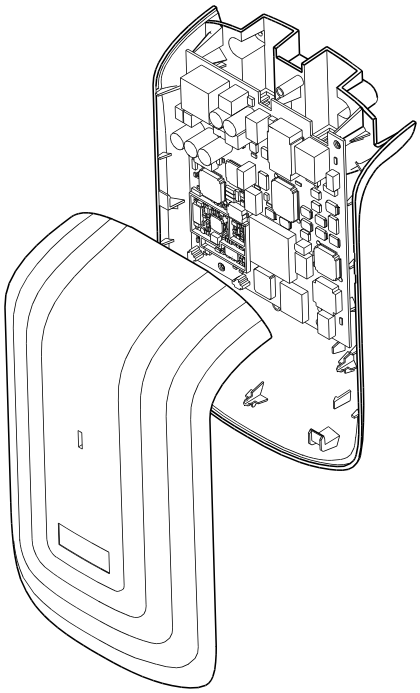


Figure 2-2: Presentation of a DECT base station

If the base station is mounted on a "metal structure" partition, the base station must be 60 to 80 cm from the partition using an extension bracket.

Connections

The maximum cable distance permitted between a base station and the PBX is 800 meters (principle of the point-to-point S0 bus).

Wiring is carried out using an STP5 cable.

For more information on connecting the base stations according to PBX type, see the corresponding section on “Deployment principles” and “Implementation of hardware”.

Rules for spacing cables relative to interference sources:

	Supplying offices	**In common areas**		
Interference source	Power cables Total parallel length L ≤ 40 m	Fluorescent tubes	Neon signs High interference (1)	Parallel power cables
Installation distance	d ≥ 2 cm	d ≥ 30 cm	d ≥ 3 m	d ≥ 30 cm

(1) high interference: industrial motors, inverters, rectifiers, transformers, high-voltage power lines, etc.

Tableau 2 : Rules for spacing cables relative to interference sources

Furthermore, intersections with power cables must be set up at right angles to minimize overlap.

In cases where old wire is to be reused, it is recommended to carry out 4 tests:

1. cross-talk measurements at 100 kHz (decoupling check and detection of any cross-talk)
2. near-end cross-talk measurements (> or = 60dB)
3. degeneration measurements at 10khz (alpha < 6 dB)
4. loop resistance measurements (R loop = R termination + R cable)

To facilitate connection to the base station, it is recommended to use:

- either a female RJ45 wall jack, and approximately 20 cm of flat RJ45-RJ45 cable,
- or a long male RJ45 jack if the cable is to be connected directly to the base station.

When installing the base station on the support, feed the cable through the indented upper part of the base station designed for this purpose.

Note: *the DECT base station is a restricted access device. Installation and maintenance must only be performed by qualified personnel.*

Old M6241 base station connections

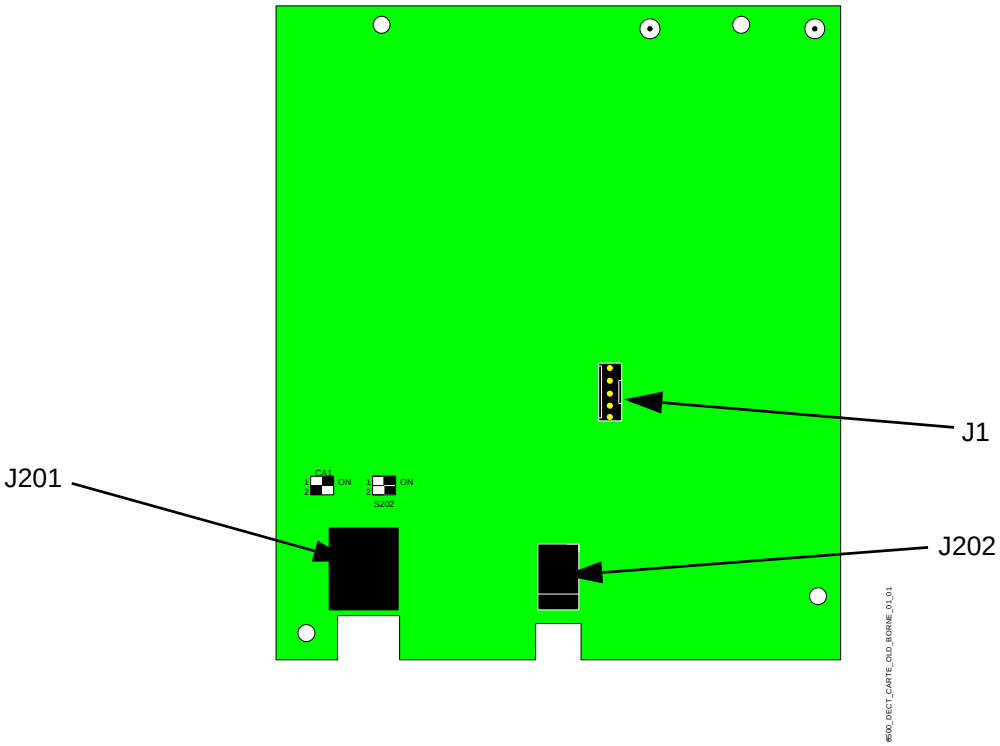
The base station is connected to its environment using 4 connectors:

- J1: HE14 connector - 5 pins, used for a debug console (reserved for the factory)
- J201: RJ45 female connector for connection to the PBX:
  - 4 pins are used for connection to the S0 Basic Rate Interface (pins 3 to 6)
  - 2 pins are used for connection to the synchronization signal (pins 1 and 2), for synchronization by 3rd pair.

Pin	1	2	3	4	5	6	7	8
Signal	SYNC+	SYNC-	ESa	RSa	RSb	ESb	-	-

Note: *The RSx pair carries the S0 BRI receive signals from the PBX.*
The ESx pair carries the S0 BRI transmit signals to the PBX.

- J202: power supply jack used to supply power locally to the base station.



The black square represents the position of the switch.

Figure 2-3: Overview of the electronic card on the old M6241 base station

New M6241 base station connections

The base station is connected to its environment using 5 connectors:

- J1: HE14 connector - 5 pins, used for a debug console (reserved for the factory)
- J2: RJ45 female connector for connection to the PBX:
  - 4 pins are used for connection to the S0 Basic Rate Interface (pins 3 to 6)
  - 2 pins are used for connection to the synchronization signal (pins 1 and 2), for synchronization by 3rd pair

Pin	1	2	3	4	5	6	7	8
Signal	SYNC+	SYNC-	ESa	RSa	RSb	ESb	-	-

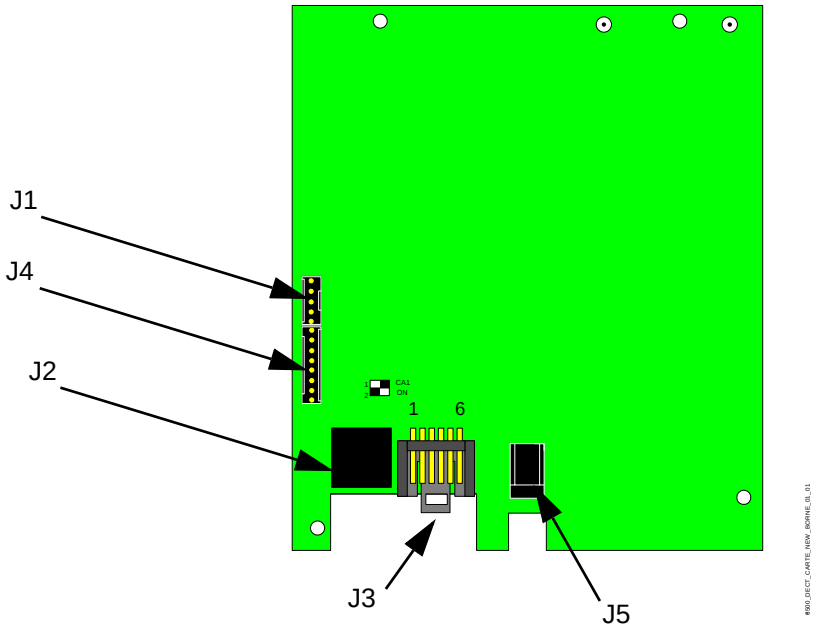
Note: *The RSx pair carries the S0 BRI receive signals from the PBX.*
The ESx pair carries the S0 BRI transmit signals to the PBX.

- J3: 6-pin male STOCKO connector (J3) parallel wired on the 6 useful pins of the RJ45 connector. It is used for CAT5 cable wiring.

Pin	1	2	3	4	5	6
Signal	SYNC+	SYNC-	ESa	RSa	RSb	ESb

- J4: HE14 connector - 8 pins, used for the JTAG port (reserved for factory)

- J5: power supply jack used to supply power locally to the base station.



The black square represents the position of the switch.

Figure 2-4: Overview of the electronic card on the new M6241 base station

The cable used to connect a base station to an S0 wall jack must conform to the France Telecom CSE B31-21 standard:

- 4-pair cable,
- connections: pin 1 to pin 1; pin 2 to pin 2; pin 8 to pin 8; etc.

Base station power supply

The base station is powered from the PBX. The remote current supplied on the S0 interface card is limited to 100 mA, which corresponds to an available supply of 4 W at 40 V or 48 V.

The base station can be powered locally by an external 220 V-AC/40 V-DC, 6.5 W transformer. The jack is built into the card.

The local power pack is made by the company MASCOT and is a non-regulated 220 VAC/42 VDC pack, type 8511DC42V with a female 3630 jack, 6.5 W (200 mA at 40 V), reference PN840B.

Note: *this solution should be used only rarely, and limited to 1 or 2 base stations - see document "DECT golden rules"*

Antennas

- **Internal antennas**
  The DECT base station is equipped as standard with two quarter-wave antennas integrated into the unit. The antenna diversity feature enables the system to automatically select the better of the two antenna signals.

- **External antennas**
  To replace the integrated antennas with one or two external antennas, a connection kit between the base station and the external antennas is required.

  If only one external antenna is used, the antenna diversity base station feature can be disabled by MMC.

  Three types of antenna can be used in DECT base stations. They are available from MAT Equipement:

Reference	Designation	Supplier
MA431X23	Omnidirectional with extension	MAT Equipement
MA431X24	Omnidirectional with extension	MAT Equipement
MA821X12	Bidirectional and directional with 50 cm cable	MAT Equipement
HT6116A	Connection kit for external antenna	AASTRA

Table 3: References of antennas used by DECT base stations

A 50-centimeter cable equipped with a male TNC connector is provided with the bidirectional antenna (MA821X12). To retain the gain/directivity character of this antenna, do not add cables between the antenna and the base station. The radiating element therefore has to be placed in immediate proximity of the base station.

Conversely, a remote connection must be used for the other two antennas (MA431X23 and MA431X24). This must not be detrimental to the radio link. Ensure that the length of coaxial cables installed between the base stations and the antenna presents sufficiently low attenuation to ensure that the base station's level of performance is identical to when it is fitted with two internal antennas. The diagram below gives the various possible configurations (for further details, refer to the external antenna installation guide provided with the connection kit).

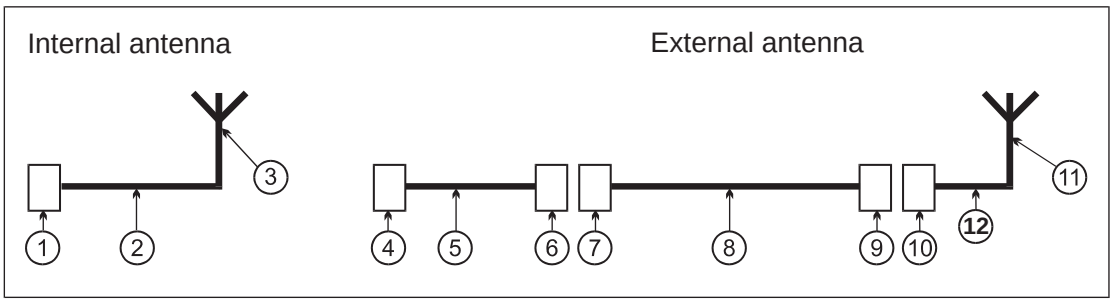


Figure 2-5: Installing an external antenna

The internal antenna comprises an MMS connector (1), a KX21 coaxial cable (2) and a radiating element (3).

The external antenna is connected using a cable (4-5-6) comprised of a male MMS connector (4), a KX21 coaxial cable (5) and a female TNC connector (6). Radiall gives losses of less than one dB (guaranteed). In fact, these losses are approximately 0.7 dB at 2 GHz.

The extension lead that carries the signal to the antenna is made up of a male TNC connector (7), a low-loss RG58cu coaxial cable (8) and a male N connector (9). The antenna (11) is attached to the extension lead via a female N connector (10).

CAUTION: For safety reasons, fit a lightning conductor on the base station and ISDN if the latter is outside (12).

The losses introduced by this extension lead are given in the following table:

Items	Loss @ Freq	Estimated loss
RG58cu	0.65 dB/meter at 2 GHz	0.6 dB
TNC	0.2 dB/meter at 9 GHz	0.1 dB
N	0.15 dB/meter at 10 GHz	0.1 dB

Table 4: Losses generated by an external antenna extension lead

The maximum length of the extension lead is approximately 2.8 meters.

This extension lead ensures identical performance of the "Internal antenna" and "External antenna" configurations when the MA431X23 antenna is used (polarisation diversity is not identical).

The MA431X24 antenna yields a gain of 2 dB more than the "Internal antennas".

Connecting an external antenna

- Remove cables 2 and 3.
- Remove plate 1.
- Fasten the cable(s) to the ANT1 and/or ANT2 external antenna connectors.

If only one external connector is connected, this should be ANT1 rather than ANT2.

- Connect the external antennas (BNC connectors).
- Specify the choice of antenna via the base station MMC.

"Antenna selection" -----> Antenna 1

2.2.2 Functional description

The DECT base station transmits and receives radio signals to and from the mobile.

4-channel base station

The D channel of the S0 BRI transports the signal between the PBX and the base station. The 2 B channels are used to transport the ADPCM encoded 4-channel voice signals at 32 Kb/S.

DECT base stations are connected to the PBX using standard S0 interface cards with a 144 kb/s throughput and a 2-pair cable (S0 point to point pinout).

Base station synchronization

The various base stations in a radio system are synchronized. If the synchronization is faulty or inexistent, the "handover" function is unavailable.

DECT base stations are controlled by a common clock so that they transmit synchronous radio signals. The clock has two transmission methods:

- synchronization by "M bit" (two pair wiring): a card declared "Master" in the system broadcasts the clock signal to all slave cards supporting base stations. These cards then transmit the clock signal to the base stations via the "M bit" of the S frame.
- synchronization by "third pair" or sync pair, where the clock extracted from the master base station S0 bus is relayed to the other base stations via a specific pair linked to the two pairs carrying the PBX signal to this base station.

  If more than 4 slave base stations are connected to a master base station, a repeater must be used to connect the slave base stations to the master base station.

The master base station must be the base station closest to the distribution frame.

It is strongly recommended to connect the master base station to the first S0 equipment declared as DECT to cell 0. This means that its RPN is 00, which facilities its subsequent identification and simplifies wiring checks.

Downloading to the base station

The base station is delivered from the factory with a software release already loaded. During the initialisation of the base station, the PBX checks which software release the base station contains. If the same release is not running on the PBX, the PBX automatically downloads its software release to the base station.

Important: new M6241 base stations are delivered with a new software release 3.2. They are not downloadable on previous releases. If a new M6241 base station is installed on a PBX release earlier than R3.2, during initial installation, the base station simulates the downloading of the PBX release but is actually inhibited. To avoid downloading base stations each time the device is started, the PBX release is stored in the memory during initial installation.

In release 3.2 and later, the PBX software contains 2 DECT catalogues, one for the new base station, the other for the old base station. Each catalogue contains 2 files, one for the ISDN part, the other for the DECT part. Base station downloading is automatically managed by the PBX.

Note: *Old and new base stations are compatible and work on any device (from V11.6 through R3.2).*

2.2.3 Specifications

The characteristics of the DECT base station are as follows:

- Frequency band: 1880 -1900 MHz.
- Number of radio channels: 10.
- Transmission power: 250 mw maximum / 10 mw average.
- Instantaneous throughput of the channel: 1152 kbit/s
- Signalling channel throughput: (D channel of the S0 BRI between the PBX and the base station): 16 kbit/s.
- Antenna type: omnidirectional.
- Integrated or external antennas.
- Coverage range: from 10 to 30 meters in an office environment and up to 300 meters in an open air environment.
- Base station operating temperature: +5, +45° C.
- Number of simultaneous calls per base station: 4.
- Base station synchronization: Yes.

Climatic conditions

In operation:

- Temperature: from 5 to 45 °C.
- Relative humidity: from 10 to 80%, no condensation.

In storage:

- Temperature: from -10 to 60 °C.
- Relative humidity: from 10 to 90%, no condensation.

If necessary, a unit is available for the base station which provides non-freezing (-20 °C) and high temperature (+60 °C) regulation.

2.2.4 Configuration of the old M6241 DECT base station

- Configuration of the switches on the base station's electronic card (see figure 3 page 25):

Switches CA1	Status	Description
 CA1	CA1-1 on ON	Activation of the adaptation resistor on the synchronization pair (factory configuration)
	CA1-2 on ON	The base station reset is only activated when the base station or PBX power is on
	CA1-2 on OFF	The base station reset is controlled by level 1 of the S0 interface (factory configuration)
Switches S202	**Status**	**Description**
 **S202**	S202-1 on ON and S202-2 on ON	Activation of the adaptation resistors (100 ohms) on the S0 pairs.

The black square represents the position of the switch.

Table 5: Configuration of the electronic card switches of the old M6241 base station

CAUTION: do not change the factory delivery configuration of S202 and CA1

- Base station status indicators:

Status	Explanation
Message lamp (off)	The base station is not powered.
Illuminated steady	The base station is powered but is not in service.
Slow flashing	The base station is loaded. The link with the PBX is operational. If DECT synchronization is active, the base station can be used.
Flashing rapidly	The base station is active and the 4 channels are in communication.

Table 6: Working light-emitting diodes (LED) on the old M6241 base station

2.2.5 Configuration of the new M6241 DECT base station

- Configuration of the switches on the base station's electronic card (see figure 4 page 26):

Switches CA1	Status	Description
	CA1-1 on ON	Activation of the adaptation resistor on the synchronization pair (factory configuration)
	CA1-2 on ON	The base station reset is only activated when the base station or PBX power is on.
	CA1-2 on OFF	The base station reset is controlled by level 1 of the S0 interface (factory configuration).

The black square represents the position of the switch.

Table 7: Configuration of the electronic card switches of the new M6241 base station

Note: *There are no activation switches for the adaptation resistors (100 ohms) on the S0 pairs, which are in point-to-point configuration. The resistors are always present.*

- Base station status indicators:

When the base station is installed, an LED displays the following statuses:

Status	Explanation
Message lamp (off)	The base station is not powered.
Flashing message lamp: ON for 50 ms OFF for 450 ms	The synchronization signal received is incorrect (for example, third pair).
Slow flashing: ON for 1 s OFF for 1 s	The base station is working and has at least one free channel.
Rapid flashing: ON for 250 ms OFF for 250 ms	Two possibilities: - either the base station is working but is saturated (no free channel). - or a loss of 8 kHz clock bit synchronization has been detected.
Flash ON: ON for 450 ms OFF for 50 ms	The base station is being loaded from the PBX.
Illuminated steady	The base station is out of service (the LED is activated by default when powered up).

Table 8: Working light-emitting diodes (LED) on the new M6241 base station

2.3 M90x mobile terminals

2.3.1 Physical description of an M90x mobile

Description

The M90x mobile terminal comprises:

- the mobile set with its battery
- a charger
- a power supply cable and mains power unit
- a belt clip kit

Figure 2-6: View of an M90x mobile terminal

For more detailed information, refer to document [3] (see "Reference documents" on page 11).

Specifications

- Weight: 135 grams.
- Dimensions: 135 x 58 x 19 mm.
- Autonomy: 10 hours talktime, 100 hours in standby mode.
- GAP compatibility (CTR22 standard).
- Charger: wall or mobile unit.
- Display: 3 lines x 12 characters with 9 icons.
- Redial (redial the last 5 numbers called).
- Call locking, pre-numbering and automatic off-hook.
- Integrated directory supporting 20 alphanumerical entries.
- Volume amplification, volume control.
- Power: 0.25 Watts.

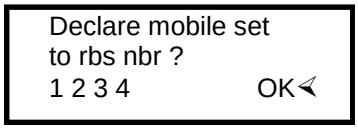
2.3.2 Configuring an M90x mobile terminal

Registering an M90x mobile terminal

A. Check that the mobile has not already been registered.

The cordless handset must not contain any "parasite" registrations (for example, from previous use on another DECT system). In the standard case where the mobile is to be used on one DECT system only, it must not be registered on any other base at the outset.

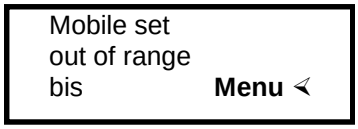
- At startup, if the mobile displays:



it is not currently registered on any other base. Press the ◅ OK key

and proceed to step 7 under paragraph B).

- If the mobile displays:



it is already registered on at least one other base.

1 Press the ◅ Menu key

2 Press the middle ➢ key until "Select base" is displayed

3 Press the Select base : key ◅

- Any base numbers already in use are displayed. These numbers must be de-registered on the mobile.

B. Register the mobile on a base

1 Press the ◅ Menu key

2 Press the middle key ➢ until “Personalize” is displayed

3 Press the Personalize key ➢

4 Press the middle key ◅ or ➢ several times until "Declare" is displayed

5 Press the Declare key ➢

The display shows: "Declare base no? 1 2 3 4 5 6 7 8".

6 Press the ◅ or ➢ key to select base 1 2 3 4 5 6 7 8.

Normally, 1 blinks and you just have to press the OK key.

7 "Enter code" appears on the display

Enter the "set number + PBX registration code" and press OK ⮜ .

The set displays "Please Wait".

- "Still waiting"
- "Declare base OK" or "Failed, Retry"

Stop and restart the mobile, then check to see if it is active.

Deregistering an M90x mobile terminal

1 Press the ⮜ Menu key

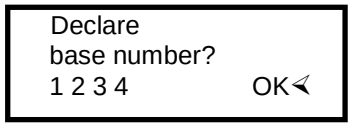
2 Press the middle key ➢ until “Personalize” is displayed

3 Press the Personalize key ➢

4 Press the middle key ⮜ or ➢ several times until "Declare" is displayed

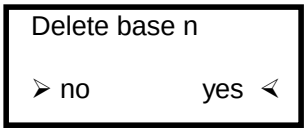
5 Press the Declare key ➢

The display shows:



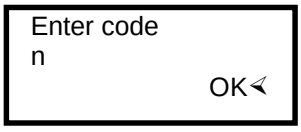
6 Press the ⮜ or ➢ key to select the base to be deleted and confirm by pressing the OK ⮜ key

The set displays:



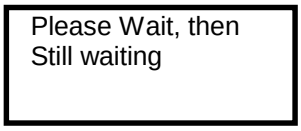
- (n = base number)
- Press the key: yes ⮜

The set displays:



7 Press the OK ⮜ key (without entering code)

The set displays:



Stop and restart the mobile by pressing the "C" key for a few seconds but not long enough for the display to change.

M90x mobile DEBUG mode

The debug menu is used to view the radio quality of the base stations detected by the mobile terminal. This mode consists of two screens: the first screen gives information about the current base station, whereas the second screen provides information on other base stations detected by the mobile terminal. Use the ⇔ key to move from one screen to another

Purpose of DEBUG mode

- To check the base station range (radio areas)
- To check that the handover function is working correctly.
- To check that the clock wiring is correct.
- To check EMC and radio interference.

When to use DEBUG mode

The user complains of:

- Breaks in communication.
- Incorrect operation of the handover function.
- Crackling during a communication.
- Line seizure with "UNAVAILABLE"
- The display shows "NOT IN RANGE".
- Site coverage (deployment).

Using DEBUG mode

- Mobile idle:

  Press MENU, then 76, then press and hold down the ➢ key at the top left.

- Mobile engaged in a call:

  Press keys 1 / 5 / 9 simultaneously

- Stopping the DEBUG function:

  Press and hold down the C key

Definition of the debug screen corresponding to the current base station

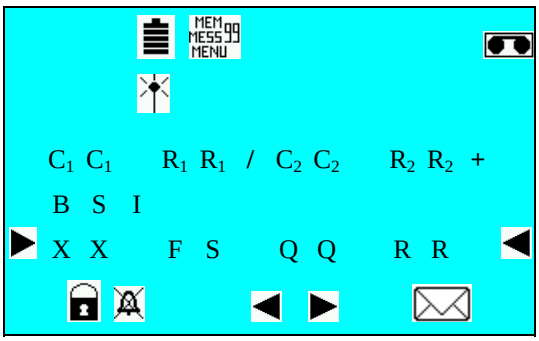


Figure 2-7: Debug screen for the current base station of an M90x mobile terminal

- XX: RPN
  Indicates the number of base station used by the mobile
- F: Frequency
  Indicates the frequency used by the mobile (0 …. 9)
- S: Slot number
  Indicates the time slot used by the mobile (0…….b)
- QQ: Quality
  Indicates the CRC value (value 40h if there is no degradation, 39h if HO request)
- RR: RSSI
  Radio level (Value between 35h and 60h for a Max. signal).
- C1C1/R1R1: RPN and RSSI
  Indicates best available base station for handover in cell XX
- C2C2/R2R2: RPN and RSSI
  Indicates second best available base station for handover in cell XX
- C2C2/R2R2+:
  Indicates that on the next page there are more than 3 base stations in cell XX

Use the ⇔ key to move from one screen to another

- ▶ or ◀ one arrow indicates that the mobile terminal is in connected mode, two arrows indicate that the mobile terminal is in a handover phase.
- Indicates that the base station with RPN XX is open for registration.
- Indicates that the base station with RPN XX is saturated (4 channels are occupied).
- MEM, MESS and MENU are displayed to show periodic channel scanning,

  not used in the field (Labo)
- This symbol is displayed during a call if the external handover is valid (indicator

  of ext. HO received from base station).

Definition of the debug screen corresponding to other base stations detected by the mobile terminal

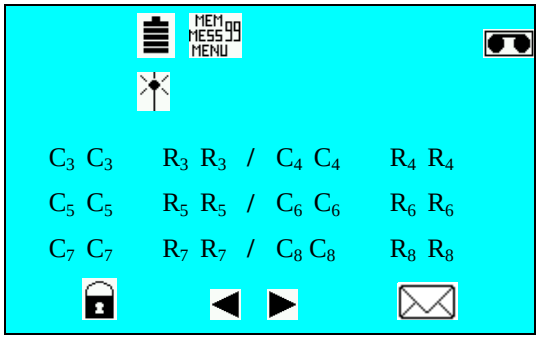


Figure 2-8: Debug screen for other base stations detected by the M90x mobile terminal

- C3C3/R3R3: RPN and RSSI
  Indicates the third best available base station for handover in cell XX
- C4C4/R4R4: RPN and RSSI
  Indicates the fourth best available base station for handover in cell XX
- C5C5/R5R5: RPN and RSSI
  of all the other base stations seen by the mobile in different cells
- C6C6/R6R6: RPN and RSSI
  of all the other base stations seen by the mobile in different cells
- C7C7/R7R7: RPN and RSSI
  of all the other base stations seen by the mobile in different cells
- C8C8/R8R8: RPN and RSSI
  of all the other base stations seen by the mobile in different cells

2.4 M910/M915 mobile terminals

2.4.1 Physical description of an M910/M915 mobile terminal

Description

The M910/M915 mobile terminal comprises:

- a terminal
- a charging unit
- an adapter
- 3 AAA-NiMH batteries
- 2 User Guides (in French and English)

Figure 2-9: View of an M910 mobile terminal

For more detailed information on the use of an M910/M915 mobile terminal, refer to document [15] (see "Reference documents" on page 11).

M910 Specifications

- Weight: 135 grams.
- Dimensions: 136 x 48 x 23 mm.
- Autonomy: 15 hours talktime, 180 hours in standby mode.
- Registration of terminal with a maximum of four 4 DECT/GAP base stations
- Display unit (LCD): 2 lines x 12 characters + 1 line for icons.
- Display of status bars: battery level and network coverage level
- Redial (redial the last 10 numbers called).
- Locking keys
- Locking the mobile terminal with a password (PIN)
- Integrated directory supporting 50 alphanumerical entries.
- Adjustable ring tone to distinguish internal calls from external calls
- Keypad keys 1 to 9 programmable in the memory for speed dialing (abbreviated numbers)
- nine languages available: English, French, German, Spanish, Italian, Dutch, Norwegian, Swedish and Portuguese.

M915 Specifications

- Weight: 150 grams.
- Dimensions: 135 x 51 x 29 mm.
- Autonomy: 10 hours talktime, 100 hours in standby mode.
- Registration of terminal with a maximum of four 4 DECT/GAP base stations
- Display unit (LCD): 2 lines x 12 characters + 1 line for icons.
- Display of status bars: battery level and network coverage level
- Headset connector
- Adjustment the headset listening volume
- Vibrator
- Redial (redial the last 10 numbers called).
- Locking keys
- Locking the mobile terminal with a password (PIN)
- Integrated directory supporting 50 alphanumerical entries.
- Adjustable ring tone to distinguish internal calls from external calls
- Keypad keys 1 to 9 programmable in the memory for speed dialing (abbreviated numbers)
- nine languages available: English, French, German, Spanish, Italian, Dutch, Norwegian, Swedish and Portuguese.
- LED: lighting during an incoming call

Headset for M915 - Specifications

- Plug diameter: 2.5mm
- 32 ohms mini.
- headset reference: TC2070A

Figure 2-10: View of an M915 mobile terminal

2.4.2 Configuring an M910/M915 mobile terminal

Registering an M910/M915 mobile terminal

It is important to follow the procedure below when registering the M910 for the first time.

1. On the mobile terminal, the line "Register" is displayed. Press the **Menu** key, select System using the ⮟ ⮝ keys and confirm with **OK**.
2. Select Register using ⮟ ⮝ and confirm with **OK**.
3. The line "PARK? : " appears. Do not make any entry. Press **Next**.
4. The line "BS-PIN" appears. Enter the mobile terminal number (4 digits) and confirm with **OK**.
5. The line "Name" appears. Enter the name of the PBX on which the mobile terminal has just been registered and press **OK** to confirm.
6. The line " Int No." appears. This is a user information line. The number of the mobile can be entered here, for example, or the number to be called if the mobile is lost. Enter the information and confirm with **OK**.
7. The mobile terminal must be configured on the base station previously recorded. Select “Menu, System, Base Station selection (choose the base station compared to the name seized into 5)”

Note: *After registering the mobile terminal, to change the PBX name and/or the Int No., use the selection "Menu, Device, OK, Save, OK, Opt, Edit; enter PBX name, OK; enter Int No., OK”.*

Canceling a registration

When the mobile terminal is registered on several base stations, to cancel the registration on a non-selected base station, proceed as follows:

1. Press the **Menu** key, select Device using the ⮟ ⮝ keys and confirm with **OK**.
2. Select Register using ⮟ ⮝ and confirm with **OK**.
3. Select the base station to be deleted using the ⮟ ⮝ keys.
4. Press the **Menu** key, select Delete using the ⮟ ⮝ keys and confirm with **OK**.

If the mobile is registered with a single base station, refer to the Installer menu.

Call rejection function

There are two options when an incoming call is received.

- The sil (silence) function removes the ring tone without interrupting the call.
- The rej (reject) function allows the calling party to suddenly hang up. When the function is activated, a “Wait” message is displayed for 35 seconds. The mobile terminal can no longer receive or make calls within these 35 seconds (busy tone). To seize the line after rejecting a call, just activate the “PLD” (line seizure) key.

Keypad lock function

The keypad lock function is accessible via the “Security” menu. Use this menu with caution. If the user forgets his PIN code, the only way the code can be reactivated is by resetting the mobile with a special tool. The mobile needs to be sent to the manufacturer repair centre for this to be done.

IMPORTANT: It is advisable to use the keypad lock function via the "Key lock. > menu".

Installer menu

The "Installer" menu is accessible via the keys **Menu * 64295**.

The installer menu contains 5 columns:

- "Versions Num": used to find out the software and hardware status of the mobile terminal and its ID,
- "Master Reset": for cancelling the mobile’s one and only basic subscription,
- "Pin reset": used to cancel the mobile’s internal information and restore the factory configuration,
- "Display Kont": for adjusting the LCD contrast,
- "Site survey": for knowing the radio reception level (simplified debug menu).
  Exemple : 1004510900
  - 35 dB FE: 0

  1004510900 : RFPI (Radio Fixed Part Identity, 40 bits information). The first 4 bytes give the installation’s PARI value (in hexadecimal), and the last byte the RPN (Radio Part Number, i.e. the number of the base station used by the mobile)

  - 35 dB: RSSI in dB (from - 35 to 100 dB), -75 = cell limit for handover

  FE: CRC error rate

Note: *To exit the "Site Survey" column, you must cut off the mobile's power supply by, for example, removing one of the three batteries from its slot.*

2.5 M92x mobile terminals

2.5.1 Physical description of an M92x mobile

Description

Although M92x and M90x mobile terminals are physically identical, M92x mobile terminals offer the following hardware and software upgrades:

- Replacement of obsolete components
- Introduction of new functions:
  - new graphical display,
  - extended directory,
  - search and call by name,
  - inbound call log,
  - outbound call log.
- Additional features:
  - quick memories,
  - "ringer off " shortcut
  - masking of the "Declare" menu
  - mobile terminal access code
  - there are two possible deactivation modes.

Figure 2-11: View of an M92x mobile terminal

The M92x mobile terminal comprises the following items:

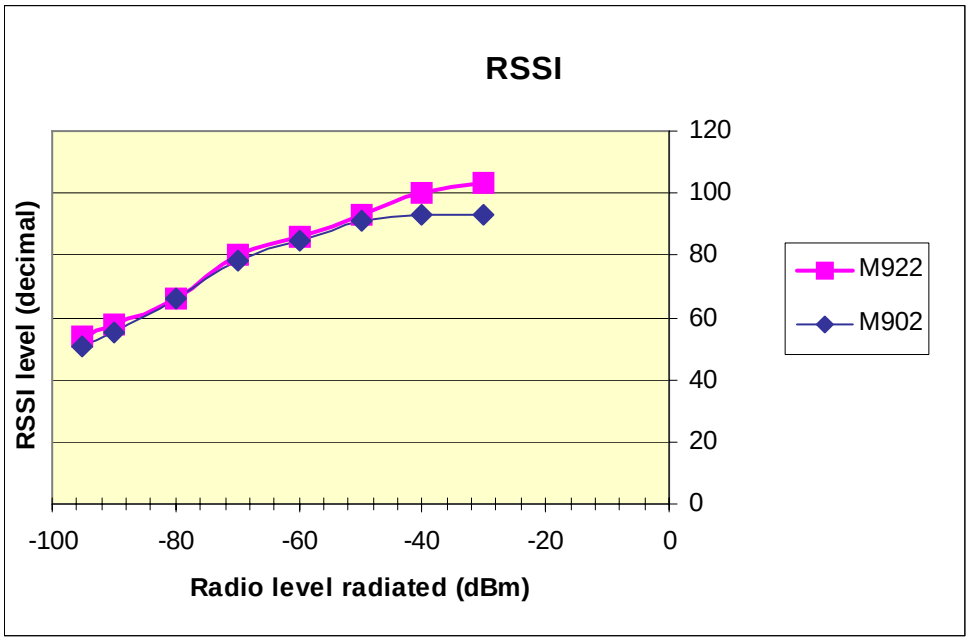
- a mobile set with its battery
- a charger
- a power supply cable and mains power unit
- a belt clip kit

For more detailed information, refer to document [16] (see "Reference documents" on page 11).

Specifications

- Weight: 120 grams.
- Dimensions: 135 x 58 x 19 mm.
- Autonomy: 10 hours talktime, 72 hours in standby mode.
- GAP compatibility (CTR22 standard).
- Charger: wall or mobile unit.
- Full graphic display: 3 lines x 12 characters with 14 icons.
- Redial (redial the last 10 numbers called).
- Call locking, pre-numbering and automatic off-hook.
- Integrated directory supporting 100 alphanumerical entries.
- Volume amplification, volume control.
- Power: 0.25 Watts.
- RSSI characteristics:

	RSSI level displayed			
RF level radiated	M902		M922	
dBm	Hex.	Déc.	Hex.	Déc.
-30	5d	93	67	103
-40	5d	93	64	100
-50	5b	91	5d	93
-60	55	85	56	86
-70	4e	78	50	80
-80	42	66	42	66
-90	37	55	3A	58
-95	33	51	36	54



New features in M92x

Note: For more detailed information on the use of an M92x mobile terminal, refer to document [15] (see "Reference documents" on page 11).

The new features available in the M92x mobile terminal are:

- new graphical display (new pictograms and new fonts)
- extended directory: the mobile terminal's private local directory has been extended to contain 100 numbers (maximum of 18 characters per number) and the associated names (12 characters maximum), arrangement of names in alphabetical order and direct programming possibility from the inbound call log or from the outbound call log.
- search and call by name in the extended directory using the alphanumeric keypad, with search and speed call possibility.
- inbound call log: maximum of 30 calls, comprising for each name (12 characters maximum), the number (18 calls maximum), time stamping (date/time) and status (not answered, not consulted, answered, consulted, called back).
- outbound call log: maximum of 10 call records comprising for each name (12 characters maximum), the number (18 calls maximum) and time stamping (date/time).
- **Additional features:**
- quick memories: allows quick access to 9 predefined memories, each belonging to the extended private directory. The principle is to associate an extended directory memory to each key on the keypad (1 to 9). To quickly start a call from any of these memories, just press and hold down the corresponding key until the associated name is displayed, then activate the "Call" command to start dialing (a new assignment deletes a previous assignment).
- "ringer off " shortcut: only with the set idle, quick activation/deactivation of the mobile's ringer by pressing and holding down the 0 key on the keypad. Possibility to activate/deactivate the ringer via the "Personalize / Ring volume" menu.
- masking of the "Declare" menu: the "Declare" menu used to declare or cancel a mobile's programming on the PBX only becomes accessible when a special installer code is entered: **Menu 9995**. It no longer appears in the "Personalize" menu.
- mobile terminal access code:
  - for activating/deactivating the optional protection via the installer menu - **Menu 9993**
  - prompt to enter an access code each time the mobile terminal is put back to service (after the mobile has been switched off or the battery has been disconnected, then re-connected),
  - personalization of the access code (4 digits, 0000 by default),
  - in the event of loss of personalized code, installer unlocking code (***#*#**), with return to the default code "0000".
- Deactivation modes:
  - by pressing rapidly the C key and "Off"
  - by pressing and holding down the C key.

Note: *In these modes, only the icon "battery charge level" flashes when the handset is placed on its charger.*

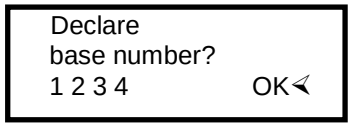
2.5.2 Configuring an M92x mobile terminal

Registering an M92x mobile terminal

A. Check that the mobile has not already been registered.

The cordless handset must not contain any "parasite" registrations (for example, from previous use on another DECT system). In the standard case where the mobile is to be used on one DECT system only, it must not be registered on any other base at the outset.

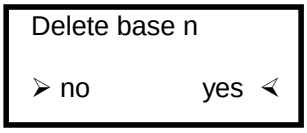
- At startup, if the mobile displays:



it is not currently registered on any other base. Press the ◅ OK key

and proceed to step 6 under paragraph B).

- If the mobile displays:



it is already registered on at least one other base.

1 Press the ◅ Menu key

2 Press the middle ➢ key until "Select base" is displayed

3 Press the Select base : key ◅

- Any base numbers already in use are displayed. These numbers must be de-registered on the mobile.

B. Register the mobile on a base

1 Press the ◅ Menu key

2 Enter the installer code 9995.

3 Press the middle key ◅ or ➢ several times until "Declare" is displayed

4 Press the Declare key ➢
The display shows: "Declare base no. 1 2 3 4 5 6 7 8".

5 Press the ◅ or ➢ key to select base 1, 2, 3, 4, 5, 6, 7 or 8. Confirm with the OK key.

6 "Enter code" appears on the display

Enter the "set number + PBX registration code" and press OK ◅ .

The set displays "Please Wait".

- "Still waiting"
- "Declare base OK" or "Failed, Retry"

Stop and restart the mobile, then check to see if it is active.

Deregistering an M92x mobile terminal

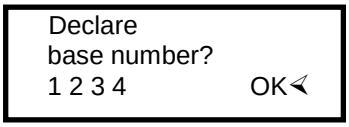
1 Press the ◅ Menu key

2 Enter the installer code 9995.

3 Press the middle key ◅ or ➢ several times until "Declare" is displayed

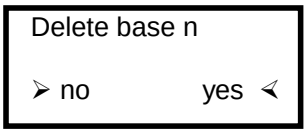
4 Press the Declare key ➢

The display shows:



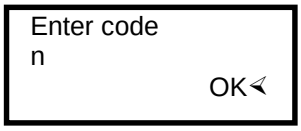
5 Press the ◅ or ➢ key to select the base to be deleted and confirm by pressing the OK ◅ key

The set displays:



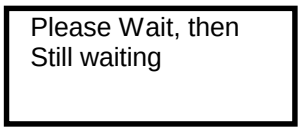
- (n = base number)
- Press the key: yes ◅

The set displays:



6 Press the OK ◅ key (without entering code)

The set displays:



Stop and restart the mobile by pressing the "C" key for a few seconds but not long enough for the display to change.

M92x mobile DEBUG mode

The debug menu is used to view the radio quality of the base stations detected by the mobile terminal. This mode consists of two screens: the first screen gives information about the current base station, whereas the second screen provides information on other base stations detected by the mobile terminal. Use the ⇔ key to move from one screen to another

Purpose of DEBUG mode

- To check the base station range (radio areas)
- To check that the handover function is working correctly.
- To check that the clock wiring is correct.
- To check EMC and radio interference.

When to use DEBUG mode

The user complains of:

- Breaks in communication.
- Incorrect operation of the handover function.
- Crackling during a communication.
- Line seizure with "UNAVAILABLE"
- The display shows "NOT IN RANGE".
- Site coverage (deployment).

Using DEBUG mode

- Mobile idle:

  Press MENU, then 76, then press and hold down the ➢ key at the top left.

- Mobile engaged in a call:

  Press keys 1 / 5 / 9 simultaneously

- Stopping the DEBUG function:

  Press the C key briefly

Definition of the debug screen corresponding to the current base station

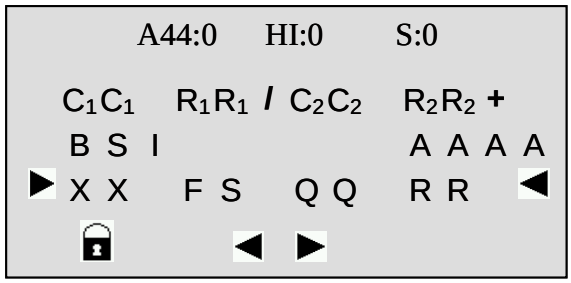


Figure 2-12: Debug screen for the current base station of an M92x mobile terminal

- XX: RPN (radio part number)
  Indicates the number of base station used by the mobile
- F: Frequency
  Indicates the frequency used by the mobile (0 …. 9)
- S: Slot number
  Indicates the slot number used by the mobile (0…….b)
- QQ: Quality
  Indicates the CRC value (value 40h if there is no degradation, 39h if HO request)
- RR: RSSI
  Radio level (Value between 35h and 60h for a Max. signal).
- BSI: Blind Slot Information
  12 bits field: 1 bit/slot (1: free, 0: busy)
- AAAA: alarm counter (in alarm mode)
  alarm counter (in alarm mode)
- C1C1/R1R1: RPN and RSSI
  Indicates best available base station for handover in cell XX
- C2C2/R2R2: RPN and RSSI
  Indicates second best available base station for handover in cell XX
- C2C2/R2R2+:
  Indicates that on the next page there are more than 3 base stations in cell XX

Use the ⇔ key to move from one screen to another

- ▶ or ◀ one arrow indicates that the mobile terminal is in connected mode, two arrows indicate that the mobile terminal is in a handover phase.
- Indicates that the base station with RPN XX is saturated (4 channels are occupied).

Line 0, comprising 16 characters, is used to display a certain number of statuses:

- A44 0/1:
  Indicates whether or not the base station is in recording mode.

The following information is used for laboratory development:

- Sx: indicates periodic scanning of DECT channels
- HI x: indicates, during a call, whether the external handover is valid (indicator of external HO received from base station).

Definition of the debug screen corresponding to other base stations detected by the mobile terminal

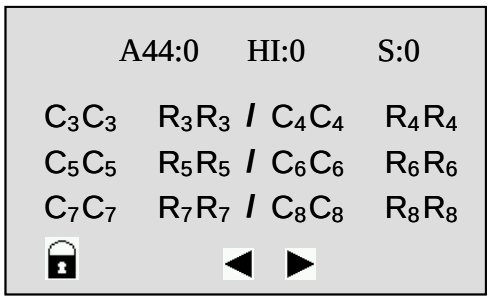


Figure 2-13: Debug screen for other base stations detected by the M92x mobile terminal

- C3C3/R3R3: RPN and RSSI
  Indicates the third best available base station for handover in cell XX
- C4C4/R4R4: RPN and RSSI
  Indicates the fourth best available base station for handover in cell XX
- C5C5/R5R5: RPN and RSSI
  of all the other base stations seen by the mobile in different cells
- C6C6/R6R6: RPN and RSSI
  of all the other base stations seen by the mobile in different cells
- C7C7/R7R7: RPN and RSSI
  of all the other base stations seen by the mobile in different cells
- C8C8/R8R8: RPN and RSSI
  of all the other base stations seen by the mobile in different cells

Indication on the backup base station table that the base station has disappeared

The backup base station table is sorted in descending RSSI order. If a base station is not detected after 3 full scanning operations on all the channels, its RSSI in the table is divided by two. In this case, the RSSI level is replaced by two stars.

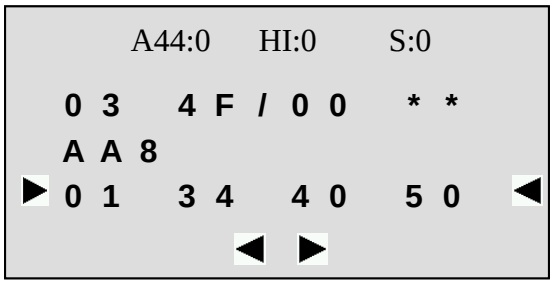


Figure 2-14: Indication on the backup base station table that the base station has disappeared

"RFPI display" mode

The RFPI (Radio Fixed Part Identity) is 40 bits information (for example 10.06.F0.FF.4A). The first 4 bytes give the device's PARI, and the last byte the RPN (Radio fixed Part Number). The RFPIs of the detected tags are recorded in a table. The "RFPI display" mode is activated by changing to debug mode and by using the directory key to display the RFPI screen. The RFPIs are displayed from the most recent to the least recent.

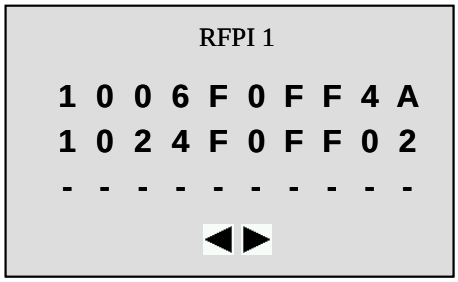


Figure 2-15: "RFPI display" mode

2.6 Functional description of M90x, M910 and M92x mobile terminals

An NeXspan C/S/L/D or NeXspan 50 or NeXspan 500 PBX manages terminal mobility with the following functions:

Authentication

Mobile authorization procedure. The decision to initiate the procedure is controlled by the PBX.

Each mobile has:

- an authentication code (AC) programmed on the mobile by the user and calculated by the PBX. It is only used for the initial authentication.
- a user authentication key (UAK) which is generated automatically. It is used for all subsequent authentications.

Authentication is performed by a specific DECT algorithm (DSAA).

The authentication procedure is activated in the following cases:

- when the mobile registers,
- after receiving n successive calls (n is a system parameter, default value: 10).

Right of access

In the case of a single site limited to 32 cells, with no company / department restrictions, the PARI loaded in each base station is used for right of access. The PARK loaded onto each set is the same as the PARI (y=32). To avoid locking onto a base station on which it is not authorised, the mobile possesses the PARK{y} information item, containing the first y significant bits of the ARI (PARI or SARI) used to encode the right of access. This information is loaded into the mobile when it registers.

When a mobile roaming request is made, the mobile receives the LAL which allows it to determine whether a roaming change declaration is necessary during reception of a new base station.

Mobile identification

Each mobile has an IPEI (terminal serial number) and an IPUI. The IPEI is comprised of the EMC (16 bits) and the PSN (20 bits). The IPUI contains 2 fields - PUT and PUN. The PUT defines the user type. Normally, type "O" is entered for this field. The PUN is the directory number of the set coded in BCD, with "F" added to the left of the digit string. It is entered in the mobile when the latter registers.

Subscription

Subscription is the registration of a mobile’s call processing features.

Location

Roaming is the procedure by which a mobile locks itself to the authorised base station emitting the best signal. The terminal decides to change base station via the "Roaming" or "Handover" procedures.

A mobile set can be in standby mode (standard status: detach) in which case it is considered to be non-located. Initiating a call from the set automatically takes it out of this mode and maintains it in located state.

If an attempt is made to call a non-located set:

- the call is forwarded to the backup set, if declared (recommended solution), then to the voice mailbox, if declared.
- If no backup set is declared, external calls are lost and internal calls receive the busy tone after 20 seconds searching for the mobile.

Roaming mechanism details

A DECT mobile scrutinizes the radio spectrum to measure the signals emitted by various base stations in the area. On power up, or on receipt of a signal stronger than the one on which the set is currently locked, the mobile starts processing the information broadcast by the dominant base station (RFPI, SARI list, etc.) and determines whether its own access rights allow it to use that base station.

If it is authorised to use the base station, it then determines whether the base station belongs to a new roaming area (cell) by comparing it's RFPI with the LAL value generated at the time of its registration.

If the comparison indicates an area change while no call is set up, the mobile sends a request to the base station for a transfer. If the response is positive, the mobile remains synchronized on the base station and continues analysing the signalling (control channel). It is then locked onto this base station.

The procedure is similar when a call is set up, except that the mobile initiates an external handover mechanism that ensures call continuity during a switch to another base station.

The PBX can refuse to allow a cell change due to access restrictions. If refused, the mobile waits a certain amount of time before making another attempt.

Roaming during an outgoing call

Roaming is at the initiative of the mobile:

- on completion of the registration procedure,
- each time it is powered on,
- in the event of external handover,
- each time it switches to another cell.

The air interface exchange protocol allows the mobile to recognize whether the base station with the strongest signal belongs to the same cell to which it was previously linked or a different one.

The PBX updates its routing tables by recording the number of the cell (referenced by sites) occupied by the mobile.

Roaming during an incoming call

An incoming call seeking a given mobile is directed according to its cell number and its site number.

2.7 Capacity

The radio network capacity depends on the PBX S0 interface card and the power supply.

Warning: do not connect other ISDN equipment on the S0 (BRI) bus when the bus has 48 V power supply.

2.7.1 NeXspan C/S/L/D

PBX	S0 interface cards	Power	Capacity
NeXspan D (XD)	LD4/LD4NX (Stocko or RJ45) + ADPCM16	48 V supplied by ADS300XD	40 base stations 4 channels
NeXspan L (XL)	LD4/LD4NX (Stocko or RJ45) + ADPCM16	48 V supplied by ADS300X	40 base stations 4 channels
NeXspan S (XS)	LD4/LD4NX (Stocko or RJ45) + ADPCM16	48 V supplied by ADS100X	8 base stations 4 channels
	UCT1-S	48 V supplied by ADS100X	4 base stations 2 channels
	UCT2-S/UCT3-S	48 V supplied by ADS100X	4 base stations 4 channels (if UCT2-S or UCT3-S equipped with an ADPCM16 daughter card)
NeXspan S12 (XS12)	UCT1S-12	48 V supplied by ADS100X	2 base stations 2 channels
	UCT2S-12	48 V supplied by ADS100X	2 base stations 4 channels (if UCT2S-12 equipped with an ADPCM16 daughter card)
NeXspan C (XC)	UCT1-C	48 V supplied by ADS50X	2 base stations 2 channels
	UCT2-C	48 V supplied by ADS50X	2 base stations 4 channels (if UCT2-C equipped with an ADPCM16 daughter card)

Table 9: Radio network capacities of NeXspan C/S/L/D PBXs

The maximum number of DECT mobile terminals is 256.

2.7.2 NeXspan 50 / NeXspan 500

PBX	S0 interface cards	Power	Capacity
For 1 CCUs	LDS + ADPCM32 or LDT + ADPCM32B	48 V supplied by ADS850	64 base stations 4 channels
For 37 CCUs	LDS + ADPCM32 or LDT + ADPCM32B	48 V supplied by ADS850	256 base stations 4 channels per site

Table 10: Capacités du réseau radio des systèmes NeXspan 50 / NeXspan 500

The maximum number of DECT mobile terminals is 256 for one CCU.

Chapitre 3 - Deployment principles

3.1 Description

Before beginning deployment procedures ensure that the following studies have been conducted:

- Radio coverage for the entire site.

  It must be possible to send and receive calls within the coverage area.

- Site traffic study.

  The number of simultaneous calls must be determined according to the number of users and their habits.

The operations to be performed can be organised into 5 distinct steps:

Note: *It is highly recommended to respect the order of these steps during deployment. Following this order will provide increased efficiency, speed and reliability of the work performed.*

1 Interview with the customer

In this step, gather all the information necessary to determine the coverage areas, and the traffic for each area.

2 Determining and segmenting the radio coverage area

The overall coverage area must be determined and divided into areas. The number and size of the areas will depend on the required coverage area, the dimensions, and physical constraints of the customer's site.

3 Determining the number of base stations

For each area, indicate the number of base stations necessary to support the level of traffic required.

4 Grouping the areas

Depending on the traffic requirements, group the areas into cells managed by the PBX.

5 Customer review and documentation

Come to an agreement with the customer and/or owner of the premises, concerning the number of base stations and their location and any modifications to be made to the premises (additional jacks, relocation of metal cabinets, etc.).

3.2 Determining the radio coverage

This section describes the principles of the site survey for positioning base stations in order to achieve complete coverage of the area.

The purpose of deployment is to determine where to locate the base stations. This cannot be achieved using only building plans; actual field measurements are required.

Certain deployment tools are used to make these measurements.

3.2.1 Deployment tool

The " M626x DECT Deployment Tool" is a DECT deployment case containing:

- a test base station,
- two test mobiles.

A description of the deployment tool and usage instructions are provided as part of the training.

Note: *This tool used for deploying M90x mobile terminals can also be used to deploy M910 and M92x mobile terminals.*

3.2.2 Base station positioning survey

As assistance to the deployment tools, it is possible to conduct a site survey for positioning the radio base stations.

The purpose of the survey is to determine the average size of the radio areas, which enables the location of the base stations to be indicated on the map; and to determine the average size of the area covered by each base station. Problem areas can also be identified and documented. The coverage tool kit can then be used to check the locations indicated on the map and, taking into account the traffic requirements, a final map can be drawn up.

Coverage area

To a large degree, the size of the radio area will depend on the materials used to construct walls, ceilings and floors and on the presence of metal cabinets.

The area corresponding to a base station’s radio range is not exactly spherical as suggested in illustrations. The size and shape of the area at any given moment depends on wall and floor materials, location and materials of furniture, machines, air conditioning, and the positioning of the base station in the environment.

Since these variable parameters must be taken into consideration, it is not possible to apply rigid rules to the calculation of the number of base stations for any given situation.

Note:

Simple lightweight or shielded concrete, plaster, and wood absorb radio waves or cause them to be propagated in different ways.

Metal walls and long rows of metal cabinets reflect all signals, resulting in significant reduction in coverage behind them.

Hospital radiology rooms protected by lead walls, and computer rooms in banks protected against all types of interference do not allow propagation of radio signals.

Metal structures found in conference halls and production rooms can also cause radio waves to be reflected due to their large metal structures. The resulting interference reduces the base station's range.

Once the nature of the materials has been identified in the coverage areas, the size of the radio areas can be evaluated, taking the following information into account:

Type of premises	Average range covered (*)
Unobstructed outdoor areas (parking lots)	200/300 m
Exhibition halls or production rooms without protrusions	100 m
Unobstructed areas with high ceilings (workshops, sales areas)	60 m
Office areas without protruding obstacles	40 m
Basements (underground parking lots)	20 m
Office area with obstacles, metal partitions Lift and stairs access areas	10 to 30 m

(*) : using integrated antennas

Table1: Evaluation of radio area size for each type of premises

Site survey

1. Inspect the building and identify a "typical area": modern building construction is generally standardised whereas in older buildings, areas may vary in structure due to previous extension or renovation. However, it is possible to identify uniform structures within these areas.
2. Identify an area with a "typical structure" for the building with nearly the same size of anticipated radio area. This area will provide a model for determining the size of the typical radio area. If a building has different structures, proceed in the same way for each area and note the differences in respect to the "typical radio area size".
3. Measure the radio area size on a horizontal plane, from the middle floor.
4. To measure the radio area size, make a call using a mobile and evaluate the communication quality while moving.
5. The radio area size can be determined as follows:
   - Install a radio base station in the centre of the "typical area" and power up the demonstration kit.
   - Switch the mobile to test mode and make a call.
   - Walk away from the base station in one direction. Enter rooms, go to the left and to the right.
   - The outer boundary of the radio area is found when the RSSI value (described in the deployment tool documentation) is displayed.
   - Repeat the same operation in several directions.
6. Measure the horizontal range on the floor above.
7. Without moving the radio base station, go to the floor directly above and measure the horizontal coverage again.

8 Measure the horizontal range on the floor below.

9 Without moving the radio base station, go to the floor directly below and measure the horizontal coverage again.

Note: *If the building allows good radio signal penetration, the vertical coverage could extend to one floor above or below the one where the base station is located.*
This method determines the horizontal and vertical coverage of a single radio base station in a typical area. The size of the radio area obtained can be considered as an average for the calculation of the total number of radio base stations.

Drawing up a map

- With the size of the typical radio area determined, draw a sketch illustrating the proposed locations of all the base stations for each floor. Indicate on the plan the anticipated coverage for each radio base station.
- Using the deployment tools, check that the actual coverage area coincides with the one mapped.
- In particular, check the coverage in problematic areas such as near elevators, staircases and the ends of building.
- If there are poor coverage areas, try to locate the base stations elsewhere. If this does not solve the problem, consider the installation of an additional base station.

Finalising the map

- When all the base station positions on the map have been checked, discuss with the customer the possibility of installing additional base stations in special areas to better support local traffic requirements.

As a result of the steps taken, the final base station layout map is drawn up and tested simultaneously.

Note: *Do not install the base stations in false ceilings.*
It is recommended to reduce a coverage area by one third in environments subject to mild radio interference (offices with metal cabinets).
Note the exact location of the base stations on the map.
Identify each base station (the number of the room in which it is installed, for example).
Locate the base stations in visible and accessible places, where it will be possible to check their correct operation by observing the units' blinking diodes.

3.3 Method of determining the number of base stations according to predicted traffic

This method allows you to determine the number of base stations required to provide service in a coverage area.

Proceed as follows:

1 Identify the traffic areas and divide them into two categories:

- Homogeneous traffic areas

A homogeneous traffic area consists of radio areas located within the same geographic sector that generate the same level of traffic (building or floor where users generate a generally constant level of traffic, without leaving this sector).

- Special traffic areas

A special traffic area consists of radio areas located within a given sector, where the traffic level varies from one radio area to the next (meeting room, cafeteria).

2 For each homogeneous and special radio area, the following parameters must be obtained from the customer:

- N: total number of mobile DECT users.
- Z: number of radio areas in the traffic area.
- m : the mobility of users within a given traffic area.

Mobility is defined for each user based on information provided by the customer during the interview. Mobility, "m", may have the following values:

- low: mobiles tend to stay within their reference areas.
- medium: intermediate.
- high: mobiles often stay outside their reference areas.
  - e: traffic in Erlangs per mobile.
  - low = 0.04 medium = 0.12 high = 0.2

If the customer does not know the exact user traffic in minutes per hour, the table below, giving typical traffic levels for various business functions, may be used as a guide to estimate the average traffic.

Traffic per mobile	Business function
Low (< 5 min./h)	hotel school
Average (from 5 to 10 min./h)	work yard retail store plant advertising agency
High (from 10 to 20 min./h)	hospital centre; locations close to operating theaters law firm real estate agency stock broker garage, workshop reception (20/25 min./h)

Table2: Determining the average traffic of the various types of activity

The traffic level given is busy hour traffic.

Dimensioning for a 4-channel base station:

Number of radio base stations for a given area according to traffic mobility parameters, and the ratio of the number of mobiles to the number of radio areas in the coverage area.

m →	LOW (0.2)			MEDIUM (0.5)			HIGH (0.8)		
N/Z ↓ e →	0.04	0.12	0.2	0.04	0.12	0.20	0.04	0.12	0.2
1	1	1	1	1	1	1	1	1	1
1.5	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1
2.5	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	2
5	1	1	1	1	1	2	1	1	2
6	1	1	1	1	1	2	1	2	2
8	1	1	1	1	1	2	1	2	2
10	1	1	2	1	2	2	2	2	3
20	1	2	2	2	2	3	2	3	3

Table3: Dimensioning for a 4-channel base station

N = Number of mobiles within a homogeneous area

Z = Number of radio areas within a homogeneous area

m = Mobility

e = Actual or estimated traffic per mobile

Note: *An integrated DECT base station supports 4 radio channels (the old base station model supports 2 radio channels).*

Example:

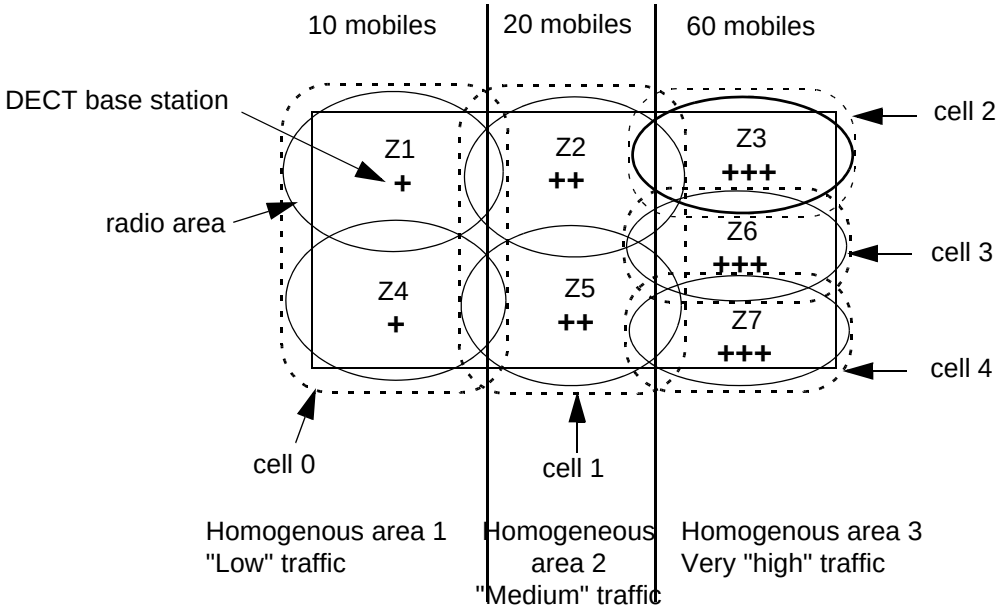


Figure 3-1 : Example of deployment

1 The deployment study produced the following information:

- total number of radio areas in the company = 7 (from Z1 to Z7)
- total number of mobiles in the company = 90

2 The following information was supplied by the customer:

User mobility: medium

Distribution of mobiles in company:

- 10 mobiles in radio areas Z1 and Z4, "low" traffic
- 20 mobiles in radio areas Z2 and Z5, "medium" traffic
- 60 mobiles in radio areas Z3, Z6 and Z7, very "high" traffic

3 The final picture will be:

- Homogenous area 1 = Z1 + Z4, "low" traffic area

  N/Z = 10/2 = 5, i.e. 1 base station per radio area
- Homogenous area 2 = Z2 + Z5, "medium" traffic area

  N/Z = 20/2 = 10, i.e. 2 base stations per radio area
- Homogenous area 3 = Z3 + Z6 + Z7, very "high" traffic area

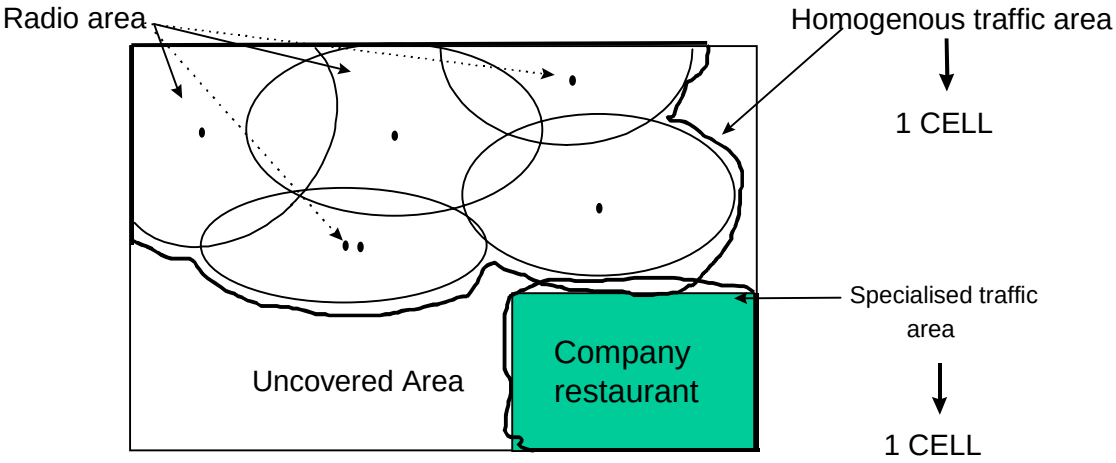
  N/Z = 60/3 = 20, i.e. 3 base stations per radio area

Homogenous area 1 has one cell (cell 0), homogenous area 2 one cell (cell 1), homogenous area 3 three cells (cells 2, 3 and 4), i.e. one cell per radio area to handle the traffic.

3.4 Grouping radio areas into cells

Since the cell is the mechanism by which the PBX locates the mobiles, it is necessary to group the radio areas into cells. The following criteria used to group radio areas into the same cell do not taken into account whether the area is homogenous or special, but consider only geographic proximity:

- Maximum number of base stations (and therefore radio areas) in one cell = 8. The recommended maximum is actually 6 to allow for an additional 2 base stations in case the initial number of base stations is not sufficient to handle the required traffic (example: if the number of mobile users increases or if the environment is modified after installation).



1 CELL = 8 radio base stations (max)

Figure 3-2: Grouping radio areas into cells

3.5 Installing and connecting the base stations

3.5.1 Installing the base stations

- The base stations must be positioned at the exact point determined by the deployment study. Moving the position of the base station by 1 or 2 meters may have a detrimental effect on transmission and reception within the radio area.
- To avoid deterioration of radio coverage, avoid installing the base stations on metallic surfaces or on load-bearing walls made of reinforced concrete. If a metallic surface cannot be avoided, use a 50 to 80 cm extension bracket.
- Do not place base stations higher than 4 meters from the ground. This is to facilitate access for maintenance purposes and to ensure correct radio range.
- Do not install base stations in false ceilings, or in a horizontal position.
- The minimum distance between co-located base stations must be 30 to 50 cm outside dimensions: possibility of having 3 co-located base stations per cell.

3.5.2 Connecting base stations

When connecting base stations, several factors affect the quality and reliability of the installation.

PBX and distribution frame

Check the ground connection on the PBX and on the distribution frame(s). A single ground connection is used.

Wires used

Wiring is carried out using an STP5 cable.

- If you want to recover existing wiring, all the shield wires must be connected to the distribution frame, which must be grounded. The shield wire is connected from the wire on the distribution frame.
- Wiring with quad wire with shield: this must be grounded.
- Wiring with quad wire without shield (not recommended)
- Wiring with category 4 or 5 computer cable: wiring must be identical for category 4 and 5. However, it is possible to ground the unused pair(s) (pair 7 – 8) (but this is not recommended for pair 1 – 2).
- In all cases, you must respect the wire manufacturer’s technical characteristics.
- If possible, check the link with a scanner.
- On the NeXspan C/S/L/D range, connection is set up using a category 5 wire or a wire with twisted pairs (for connection with RJ45 connectors). A twisted cable (a 3/6 pair and a 4/5 pair) is required to connect DECT base stations to the integrated S0 accesses of the CPU card.
- Regarding the F1 range, for a wall-mounted or CTM distribution frame, wiring must be done with the twisted telephone jumper.

For information on wiring base stations according to PBX type, refer to the corresponding section on “Implementation of hardware”.

Chapter 4 - Implementation of hardware on NeXspan C/S/L/D

4.1 Conventions used for card names

All expansion cards exist in two physical formats:

- format fitted with an extraction handle and Stocko connectors. These Stocko cards have the name of the card followed by the extension ST (example : LD4 ST, LD4NX ST).
- format with a front panel for RJ45 connectors. These RJ cards have the name of the card followed by the extension RJ (example : LD4 RJ, LD4NX RJ).

When a card is referred to in general, whether it is a Stocko or RJ45 card, only the name of the card is used (LD4, LD4NX, etc.).

When a CPU card is referred to in general, whether it is a first or seconde or third generation card, only the standard name of the card is used: UCT-S, UCTS-12 et UCT-C.

4.2 Interface cards

The cards used to connect DECT base stations to NeXspan C/S/L/D range devices are:

- LD4/LD4NX cards, If necessary equipped with the ADPCM16 daughter card.

  Note: *There are two operating modes on the LD4NX card. The LD4N standard operating mode compatible with the previous LD4 card and the LD4X operating mode obtained by removing or plugging the jumper J14 into pins 1 and 2. The LD4X operating mode, only compatible as of release R4.1, is used to implement additionnal functions (see § 4.5 et § 4.6).*

- UCT-S CPU cards (UCT2-S/UCT3-S, if necessary equipped with the ADPCM16 daughter card) of NeXspan S.
- UCTS-12 CPU cards (UCT2S-12/UCT3S-12, if necessary equipped with the ADPCM16 daughter card) of NeXspan S12.
- UCT-C CPU cards (UCT2-C, if necessary equipped with the ADPCM16 daughter card) of NeXspan C.

LD4 and LD4NX cards

The LD4 and LD4NX cards have four T0/S0 interfaces and are used to manage 2- or 4-channel DECT base stations. The T0/S0 interfaces are configured by MMC:

- as T0 for connection of an ISDN network basic rate interface,
- as S0 for connection of an ISDN terminal or DECT base station.

The LD4 and LD4NX cards also allow the connection of four 2-channel DECT base stations or four 4-channel DECT base stations if they are equipped with an ADPCM16 card.

Note: *You can install a LD4/LD4NX card in a non rackable NeXspan S12 if a backplane has been added (optional). The non rackable standard NeXspan S12 cannot be fitted with expansion cabinets. The rackable standard version is fitted with a backplane and can be fitted with 3 expansion cards (RJ45 format).*

The LD4NX card is used to manage the M bit channel by channel. For software releases before 3.2, the 4 equipment interfaces on the LD4NX card (LD4N mode) generate the M bit in the S frame every 800 ms (factory setting). This setting can be changed to 5 ms for particular ISDN applications (video conference, router) if the set of resistors on the card (R91 and R67) are modified. From release 3.2, operation at 5 or 800 ms is determined automatically. The LD4NX card access are initialized channel by channel, according to is configuration:

- DECT M bit S frame: the interface generates the M bit in the S frame to the base station every 800 ms.
- DECT master base station, DECT slave base station or non-DECT S0 terminal: the interface generates the M bit in the S frame to the base station every 5 ms. The slave base station does not use this synchronization; it uses only the 800ms clock transmitted by the master base station via the third pair.

UCT-S, UCTS-12 and UCT-C cards

The UCT-S, UCTS-12 and UCT-C cards are NeXspan S, NeXspan S12 and NeXspan C CPU cards with four T0/S0 interfaces.

The T0/S0 interfaces are used to connect:

- four 2-channel DECT base stations (on UCT1-S) and 4-channel (on UCT2-S/UCT3-S equipped with an ADPCM16 daughter card).
- two 2-channel DECT base stations (on UCT1S-12) and 4-channel (on UCT2S-12/UCT3S-12 equipped with an ADPCM16 daughter card).
- two 2-channel DECT base stations (on UCT1-C) and 4-channel (on UCT2-C equipped with an ADPCM16 daughter card).

The T0/S0 interfaces are configured by MMC (and by setting jumpers, see Figure 4-17:):

- as T0 for connection of an ISDN network basic rate interface,
- as S0 for connection of an ISDN terminal or DECT base station.

4.3 (Factory) configuration of the LD4 ST card with Stocko format

The black square represents the position of the switch.

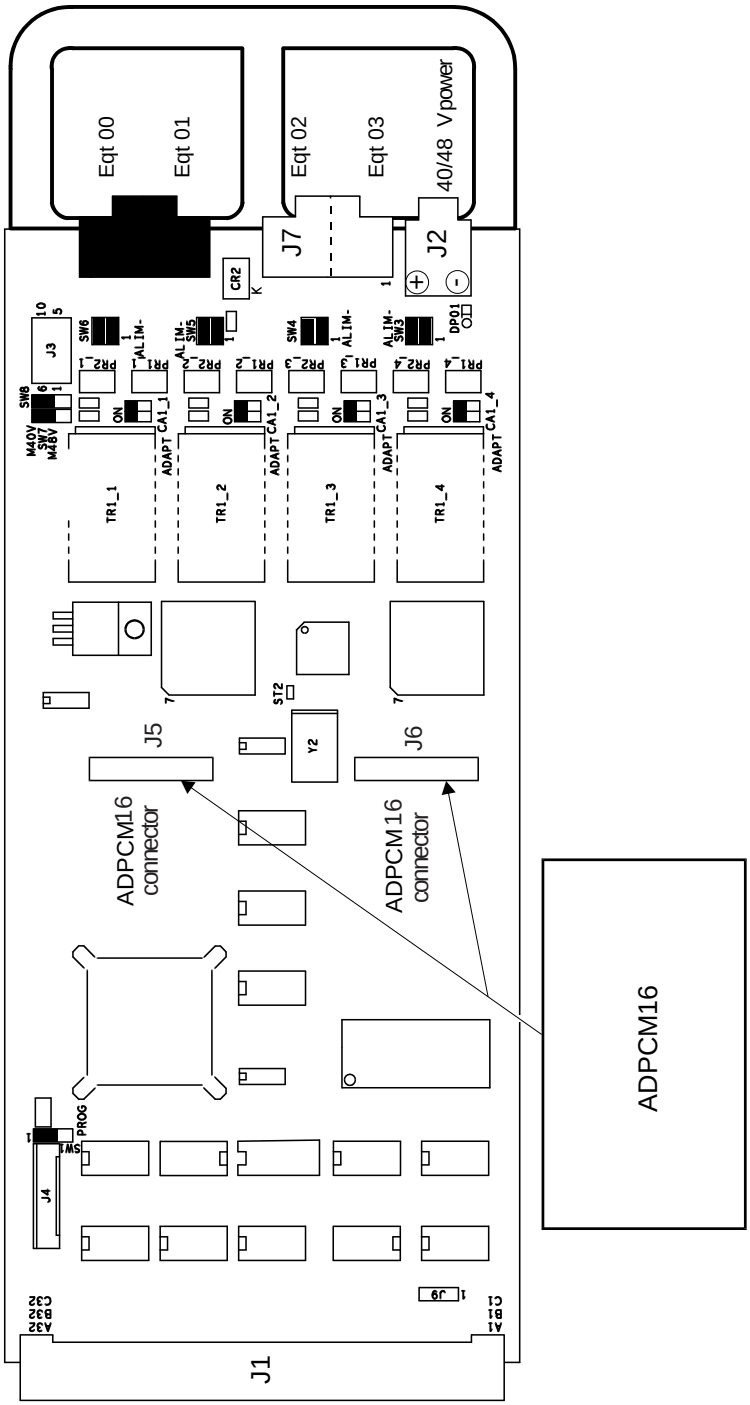


Figure 4-1: Top view of the LD4 ST card

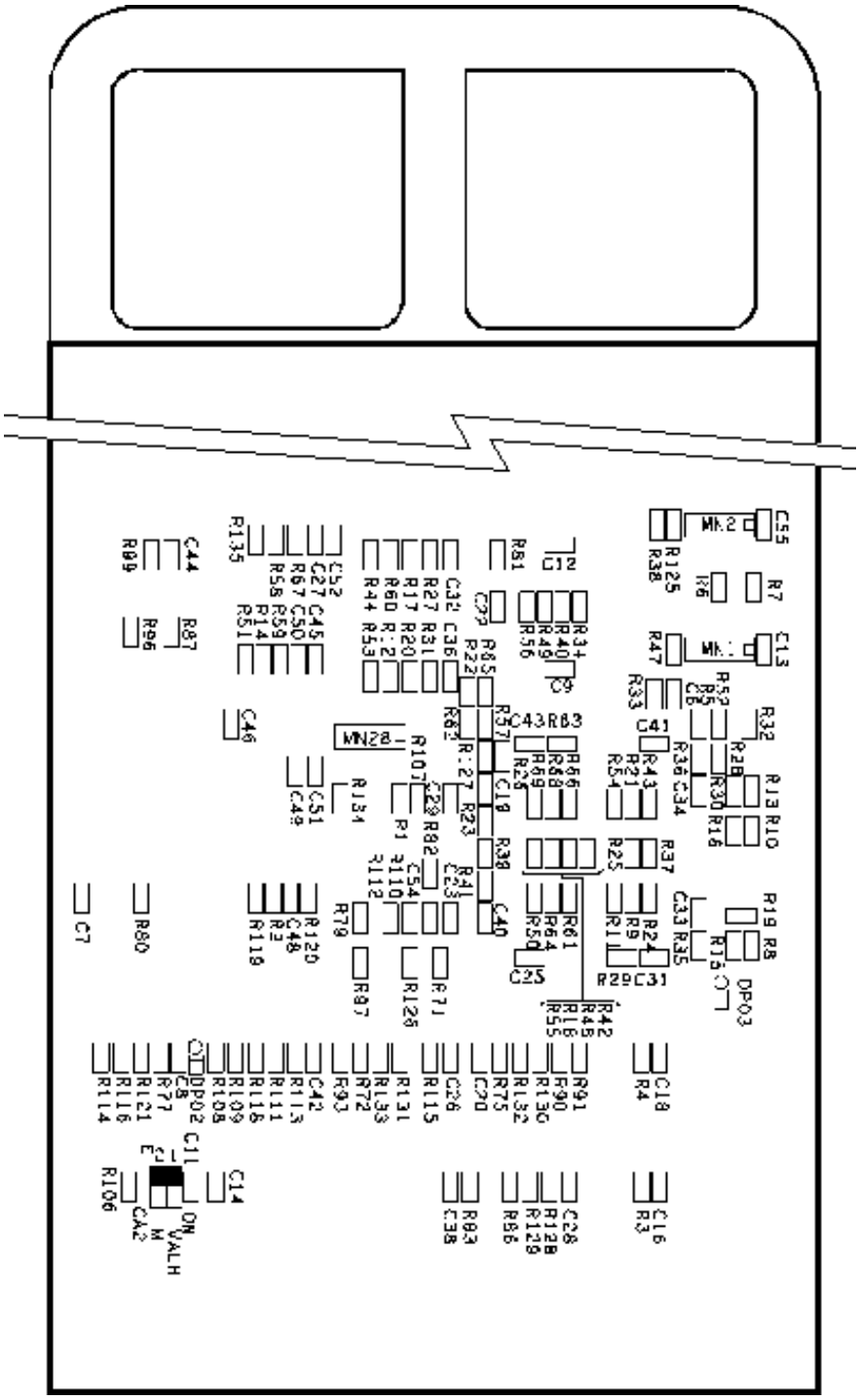


Figure 4-2: Bottom view of the LD4 ST card

4.3.1 Description of the connectors

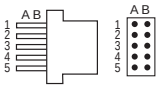
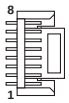
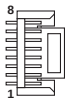
Label	Feature
J2 	40 V remote power supply connection
J3 	Factory reserved.
J4 	Factory reserved
J5 and J6 	ADPCM 16 daughter card connection
J7 	Connection for 2 DECT base stations Interface 2: Interface 3: Pin 5: ED2 Pin 1: ED3 Pin 6: NED2 Pin 2: NED3 Pin 7: RD2 Pin 3: RD3 Pin 8: NRD2 Pin 4: NRD3
J8 	Connection for 2 DECT base stations Interface 0: Interface 1: Pin 5: ED0 Pin 1: ED1 Pin 6: NED0 Pin 2: NED1 Pin 7: RD0 Pin 3: RD1 Pin 8: NRD0 Pin 4: NRD1
J9	Not fitted

Table 1: Description of the LD4 ST card connectors

4.3.2 Description of the switches

CA1.1 to **CA1.4**: these switches are used to adapt lines (factory setting, leave set to ON).

CA2 (located on the copper side): configure according to the card's location and mode (master/slave).

For LD4 ST in T0

CA2.1 (VALH)	Feature
ON	Leave set to ON position. If the LD4 ST card is fitted in a synchronising slot, the ON position allows the PBX to take the ISDN network clock as reference clock. In a non-synchronising slot, CA2.1 has no effect. The synchronising positions in an XL cabinet are the locations 1-00 to 1-05. For an XS cabinet, all positions are synchronising.
OFF	Do not set it to OFF position (in OFF position, the ISDN clock is not taken as reference, whatever the slots).

Case of LD4 ST in S0 configuration (for DECT BS)

CA2.2 (M/S)	Feature
M	LD4 ST master: **position not allowed**
S	to be set in position E on all LD4 ST cards

Table 2: Description of switches CA2.1 and CA2.2 on the LD4 ST card

SW1: factory reserved; leave in position 1-2.

SW3, **SW4**, **SW5**, and **SW6**: these jumper switches are used to disable each interface's remote power supply when a T0 interface is connected.

SW3	Remote power supply for interface 3
SW4	Remote power supply for interface 2
SW5	Remote power supply for interface 1
SW6	Remote power supply for interface 0

Table 3: Description of switches SW3 to SW6 on the LD4 ST card

SW7 and **SW8**: these jumper switches are used to set either a 40 V or 48 V remote power supply

Note: *The power supply units of the NeXspan range do not supply ISDN 40 V. To supply 40 V to sets and/or base stations, connect an external power supply unit to the J2 connector on the LD4 ST card.*

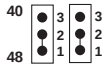
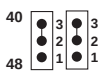
SW7 and SW8	Positions	Feature
	1-2	Selects the 48 V power supply
	2-3	Selects the 40 V power supply

Table 4: Description of switches SW7 and SW8 on the LD4 ST card

4.3.3 Position of LD4 ST card

The possible slots and restrictions for the LD4 card in a NeXspan cabinet are the same as for the LD4NX card see § 4.6.5.

4.3.4 Connecting base stations

Each terminal is connected to the ISDN S0 (BRI) of an LD4 ST card, and uses two pairs: 1 transmit pair and 1 receive pair.

Note: *if there are a DECT base station and an S0 terminal (other than the base station) on the same card, the base station must be powered with 40 V. The NeXspan power supply units do not supply ISDN 40 V. To supply 40 V to sets and/or base stations, connect an external power supply unit to the J2 connector on the LD4 ST card.*

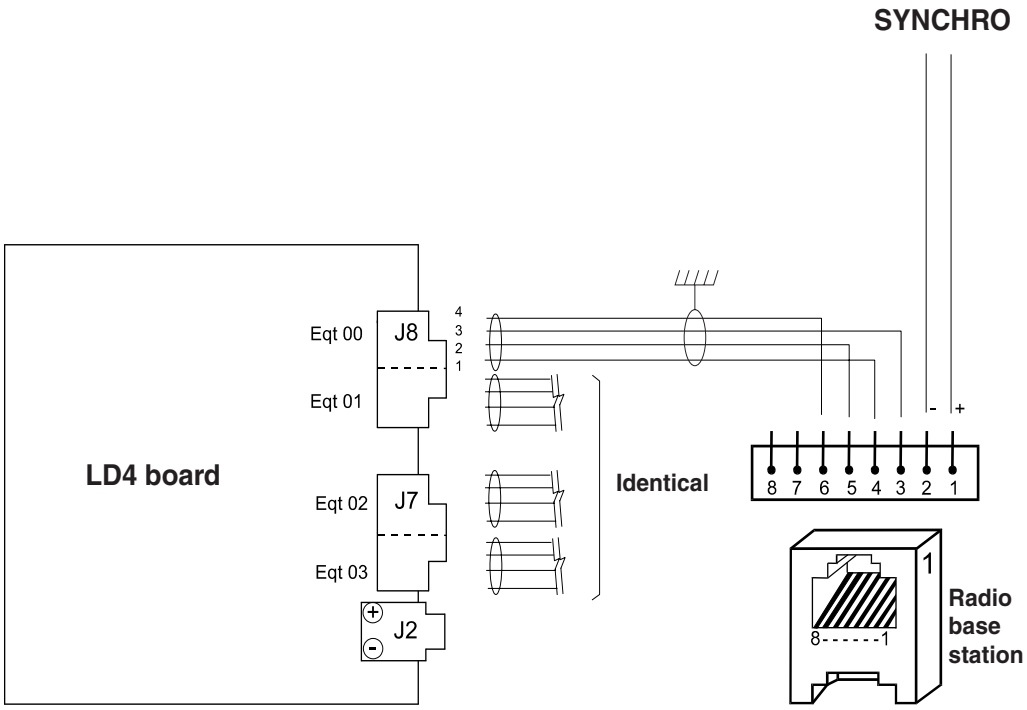


Figure 4-3: Connecting a base station to an S0 interface of an LD4 ST card

S0 interface link with DECT base station:

8-pin STOCKO connector	RJ45 connector
Pin 4 (NRD1)	Pin 6
Pin 3 (RD1)	Pin 3
Pin 2 (NED1)	Pin 5
Pin 1 (ED1)	Pin 4

Table 5: S0 interface link of an LD4 ST card with a DECT base station

4.4 (Factory) configuration of the LD4 RJ card with RJ45 format

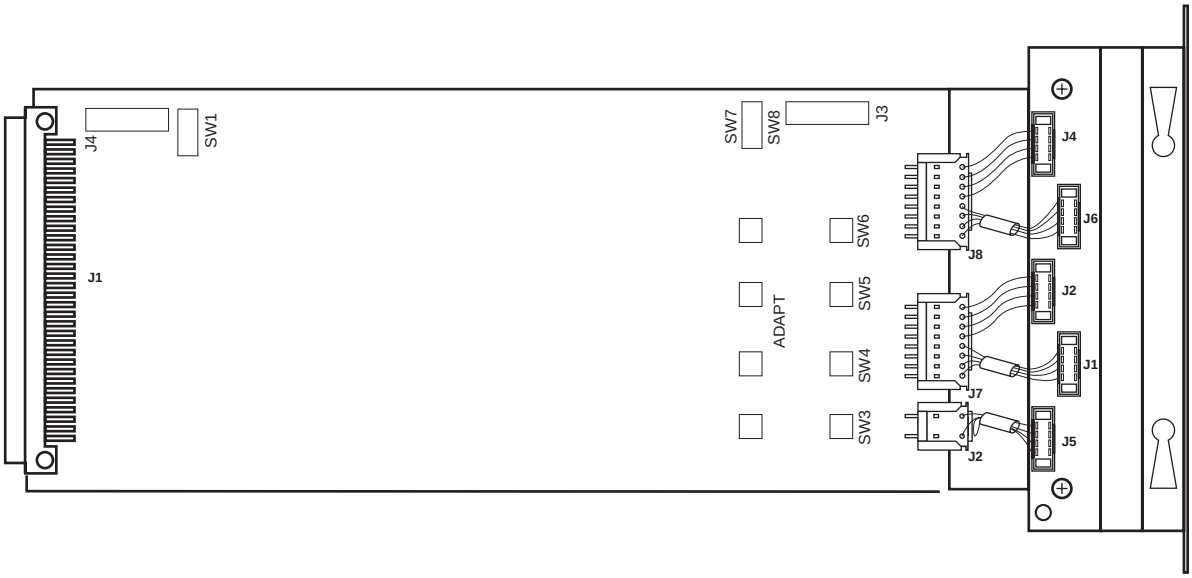


Figure 4-4: Overview of the LD4 RJ card

4.4.1 Description of RJ45 connectors

- 8 x 8-pin RJ 45 ports

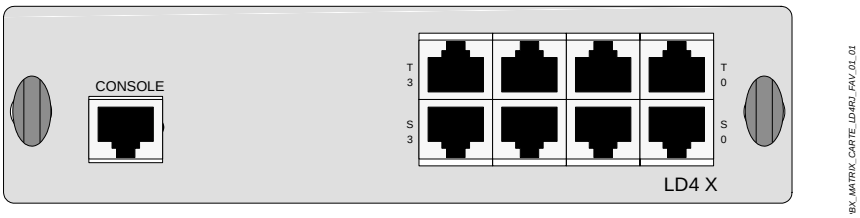


Figure 4-5: Front panel of LD4 RJ card

Check that signals match pins:

	LINE NO.			
Pin No.	S3	S2:	S1	S0
1	M40 V			
2				
3	RD3	RD2	RD1	RD0
4	ED3	ED2	ED1	ED0
5	NED3	NED2	NED1	NED0
6	NRD3	NRD2	NRD1	NRD0
7				
8	P40 V			

Table 6: S0 connector pinout on the LD4 RJ card

Note: *40 V can also be supplied on connector T3 (connect the 40 V supply unit to connector T3, and the base station to connector S3).*

4.4.2 Switch settings

CA1.1 to **CA1.4 (ADAPT)**: these switches are used for line adaptation. Leave these switches on the setting ON (factory setting).

CA2: the **CA2** switch (located on the copper side) is used to configure synchronization (T0) and master or slave mode (S0).

For LD4 RJ in T0

CA2.1 SWITCH	EXPLANATION
ON	Leave set to ON position. If the LD4 RJ card is fitted in a synchronising slot, the ON position allows the PBX to take the ISDN network clock as reference clock. In a non-synchronising slot, CA2.1 has no effect. The synchronising positions in an XL cabinet are the locations 1-00 to 1-05. For an XS cabinet, all positions are synchronising. On XS12, the backplane does not transmit the network synchronisation (synchronising slots are T0 interfaces built into the UCT card).
OFF	Do not set it to OFF position (in OFF position, the ISDN clock is not taken as reference, whatever the slots).

For LD4 RJ in S0 (for DECT base stations)

SWITCH CA2.2	EXPLANATION
M	**Position not allowed**
S	Slave LD4 RJ: To be set to position S on all LD4 RJ cards (LD4 RJ card always slave).

Table 7: Description of switches CA2.1 and CA2.2 on the LD4 RJ card

SW1: this jumper is not used, leave in position 1-2.

SW3, **SW4**, **SW5**, and **SW6**: these jumper switches are used to disable each interface's remote power supply when a T0 interface is connected.

SW3	Remote power supply for interface 3
SW4	Remote power supply for interface 2
SW5	Remote power supply for interface 1
SW6	Remote power supply for interface 0

Table 8: Description of switches SW3 to SW6 on the LD4 RJ card

SW7 and **SW8**: the jumpers allow the selection of a 40 V or 48 V power supply.

Note: *The power supply units of the NeXspan range do not supply ISDN 40 V. To supply 40 V to sets and/or base stations, connect an external power supply unit to the T3 connector on the LD4 RJ card.*

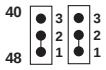
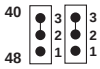
SW7 and SW8	Positions	Feature
	1-2	48 V selected
	2-3	40 V selected

Table 9: Description of switches SW7 and SW8 on the LD4 RJ card

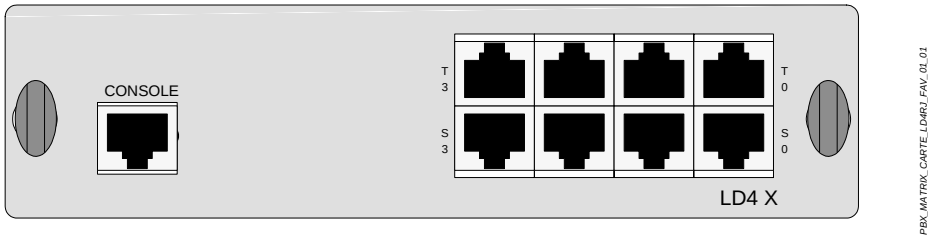
4.4.3 Position of LD4 RJ card

The possible slots and restrictions for the LD4 card in a NeXspan cabinet are the same as for the LD4NX card (see section 4.6.5).

4.4.4 Connecting base stations

Each base station is connected to the ISDN S0 (BRI) of an LD4 RJ card, and uses two pairs: 1 transmit pair and 1 receive pair.

Note: *If there are a DECT base station and an S0 terminal (other than the base station) on the same card, the base station must be powered with 40V. The NeXspan power supply units do not supply ISDN 40 V. To supply 40 V to sets and/or base stations, connect an external power supply unit to the T3 connector on the LD4 RJ card.*



PBX_MATRIX_CARTE_LD4RJ_FAV_01_01

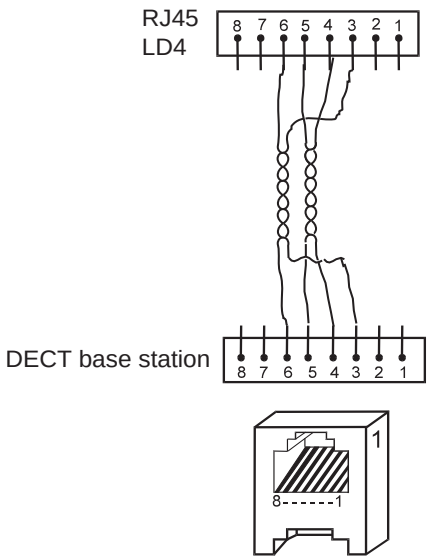


Figure 4-6: Connecting a base station to an S0 interface of an LD4 RJ card

S0 interface link with DECT base station:

LD4 RJ card RJ45 connector	Base station RJ45 connector
Pin 6 (NRD1)	Pin 6
Pin 3 (RD1)	Pin 3
Pin 5 (NED1)	Pin 5
Pin 4 (ED1)	Pin 4

Table 10: S0 interface link of an LD4 RJ card with a DECT base station

4.5 (Factory) configuration of the LD4NX ST card with Stocko format

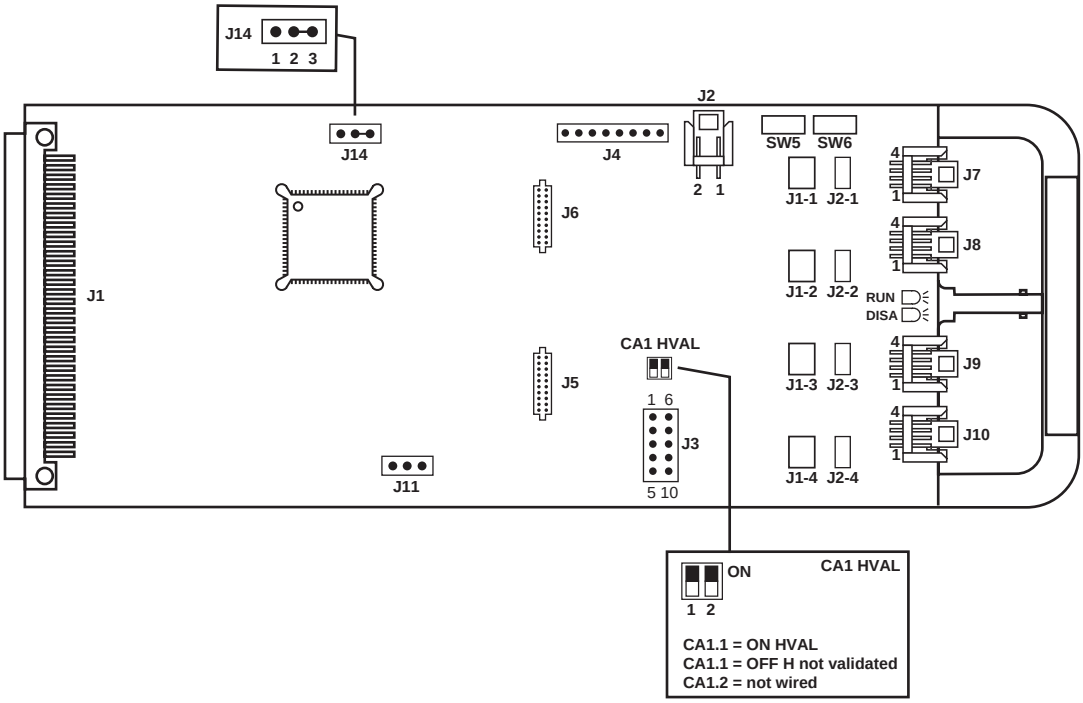


Figure 4-7: Top view of the LD4NX ST card

There are two operating modes on the LD4NX ST card:

- LD4N operating mode : standard LD4N configuration (operating mode compatible with the previous LD4 card).
- LD4X operating mode, only compatible as of release R4.1 : LD4X operating mode is obtained by removing or plugging the jumper J14 into pins 1 and 2 and is used to implement following additionnal functions:
  - the LD4NX ST card in LD4X mode uses the junction assigned to its slot, there are no more restrictions concerning card installation rules,
  - hardware information of the card can be displayed by MMC (an EEPROM is installed on the LD4NX ST card in LD4X mode),
  - you can declare up to 10 LD4NX ST cards in LD4X mode on a NeXspan L,
  - the remote power supply status of LD4NX ST card S0 accesses in LD4X mode can be displayed as soon as the card is in service.

4.5.1 Description of the connectors

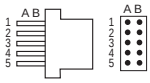
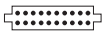
LABEL	FUNCTIONS/CHARACTERISTICS	CONTACTS
J1	96-pin connector: backplane connection.	
J2 	STOCKO male connector, 2 pins: receives the ISDN 40 V remote power supply when the latter is not available on the PBX backplane (40 V only supplied on the backplane of a NeXspan-range XL PBX) .	• Pin 1: M40V • Pin 2: P40V
J3 	HE14 connector - 2 x 5 male pins, (debug console, reserved for manufacturer).	not used
J4 	HE14 connector - 1 x 8 male pins: used for loading programmable components "On Site" (reserved for manufacturer).	not used
J5 and J6 	Two connectors AMP CMS 2 x 10 female pins: hosts an ADPCM16V daughter card. *Caution: The ADPCM8V daughter card is not managed by the LD4NX ST card.*	
J7 to J10 	Four STOCKO male connectors, 4 pins: connection of the S0/T0 interfaces.	Interface 0 (on J7): • Pin 1: ED0 • Pin 2: NED0 • Pin 3: RD0 • Pin 4: NRD0 Interface 1 (on J8): • Pin 1: ED1 • Pin 2: NED1 • Pin 3: RD1 • Pin 4: NRD1 Interface 2 (on J9): • Pin 5: ED2 • Pin 6: NED2 • Pin 7: RD2 • Pin 8: NRD2 Interface 3 (on J10): • Pin 1: ED3 • Pin 2: NED3 • Pin 3: RD3 • Pin 4: NRD3
J11	Male connector, 3 pins, (CPUTIME tool, reserved for manufacturer).	not used

Table 11: Description of the LD4NX ST card connectors

4.5.2 Switch settings

Note: *The Master/Slave micro-switch of previous LD4 cards no longer exists. The LD4NX ST card is always in DECT slave mode; it cannot generate the DECT clock.*
The LD4NX ST card has no micro-switch for downloading the flash memory with a BOF3 type tool (automatic detection).

- Micro-switch **CA1** (HVAL) is used to configure synchronization (T0).

MICRO-SWITCH CA1 (HVAL)	EXPLANATION
ON	Leave set to ON position. If the LD4NX ST card is fitted in a synchronising slot, the ON position allows the PBX to take the ISDN network clock as reference clock. In a non-synchronising slot, CA1 has no impact. The synchronising positions in an XL cabinet are slots 1-00 to 1-05. For an XS cabinet, all positions are synchronising.
OFF	Do not set it to OFF position (in OFF position, the ISDN clock is not taken as reference, whatever the slots).

Table 12: Description of the CA1 switch on the LD4NX ST card

- Jumpers **J1_1, J1_2, J1_3 and J1_4** are used to enable the remote power supply (40 V or 48 V) of each interface where an S0 interface is connected:

Caution: In T0, remove the jumpers (conflict between the 48V supplied by the system and the 40V supplied by the public exchange).

  - J1_1: Remote power supply for interface 0
  - J1_2: Remote power supply for interface 1
  - J1_3: Remote power supply for interface 2
  - J1_4: Remote power supply for interface 3

Note: *J2_1, J2_2, J2_3 and J2_4 are storage positions for jumpers.*

- A jumper positioned on SW5 or SW6 is used to select the 40V or 48V remote mains supply.
  - Jumper positioned on SW5 (factory position) is used to select the 48V power supply.
  - Jumper positioned on SW6 is used to select the 40V power supply.

Note: *The jumper status of remote supply and synchronization for an LD4NX ST card in LD4X mode can be displayed by MMC (menu 3-2-4, "ISDN board switches status", see Figure 4-18).*

- Jumper J14 is used to select the card's operating mode (LD4N or LD4X) :
  - leave the jumper in factory position 2-3 for a LD4N configuration,
  - plug the jumper into pins 1 and 2 or remove the jumper for a LD4X configuration used to implement additionnal functions.

4.5.3 Description of the diodes

Label	Color	Feature
RUN	Green	Shows the operating status of the card
DISABLED	Orange	Not used

Table 13: Description of LD4NX ST card LEDs

4.5.4 Position of LD4NX ST card

The possible slots and restrictions for the LD4NX card in LD4N mode in a NeXspan cabinet are the same for the LD4 card, see § 4.6.5.

Caution: The restrictions concerning installation of LD4 and LD4NX cards in LD4N mode do not exist for LD4NX card in LD4X mode, see § 4.6.5 .

Note: *The LD4NX ST card can be hot-plugged/removed in an operational XL PBX or a rackable XS PBX.*

4.5.5 Connecting base stations

Each base station is connected to the ISDN S0 (BRI) of an LD4NX ST card, and uses two pairs: 1 transmit pair and 1 receive pair.

Note: *If there are a DECT base station and an S0 terminal (other than the base station) on the same card, the base station must be powered with a 40 V supply.*

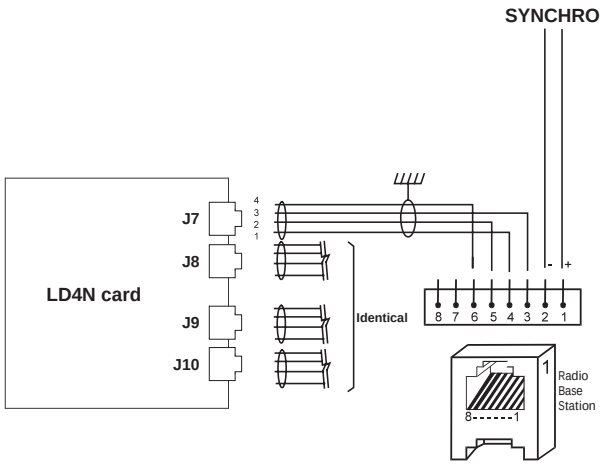


Figure 4-8: Connecting a base station to an S0 interface of an LD4NX ST card

S0 interface link with DECT base station:

4-pin STOCKO connector	Base station RJ45 connector
Pin 4 (NRD0)	Pin 6
Pin 3 (RD0)	Pin 3
Pin 2 (NED0)	Pin 5
Pin 1 (ED0)	Pin 4

Table 14: S0 interface link of an LD4NX ST card with a DECT base station

4.6 (Factory) configuration of the LD4NX RJ card with RJ45 format

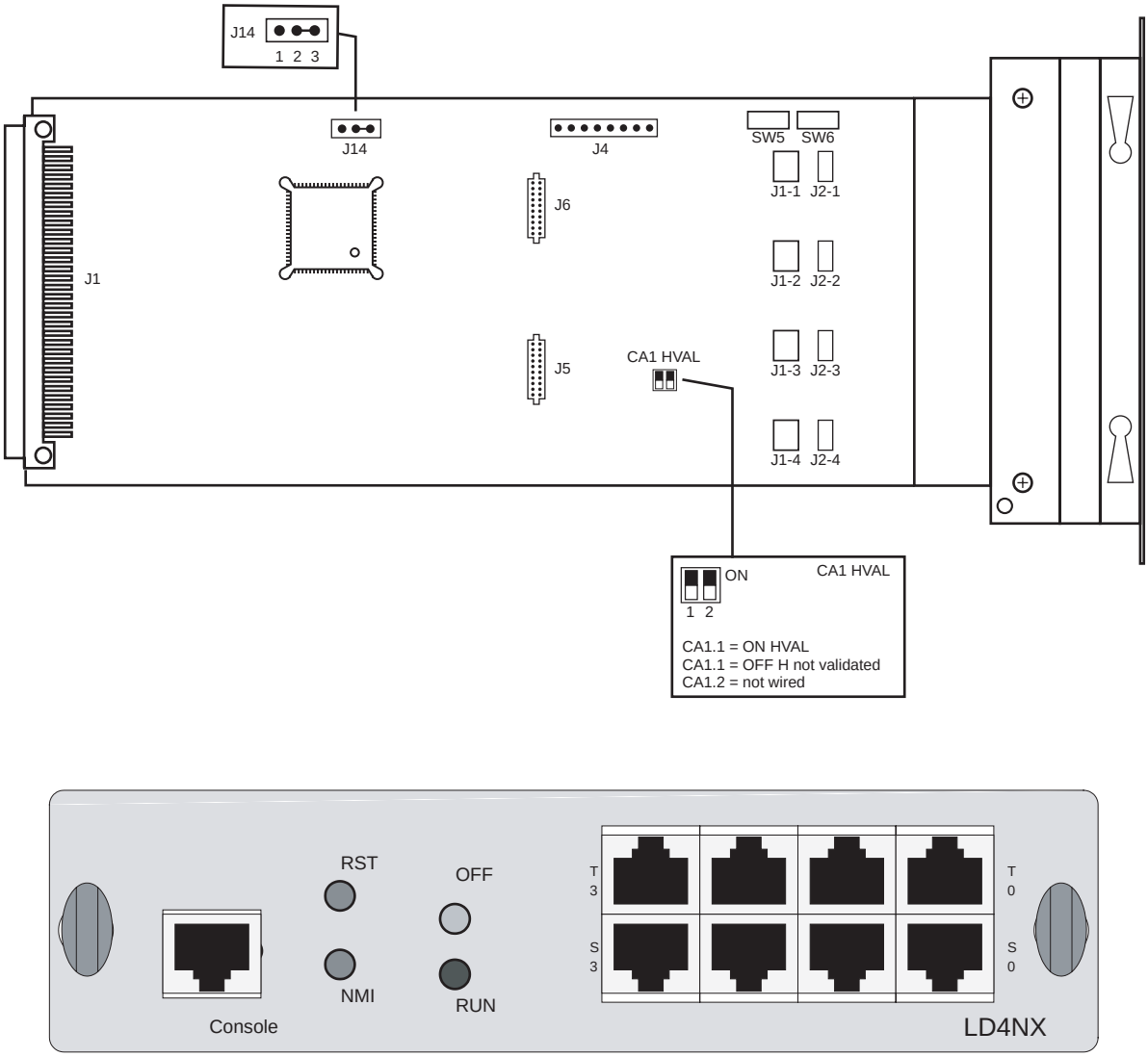


Figure 4-9: Overview of the LD4NX RJ card

There are two operating modes on the LD4NX RJ card:

- LD4N operating mode : standard LD4N configuration (operating mode compatible with the previous LD4 card).
- LD4X operating mode, only compatible as of release R4.1 : LD4X operating mode is obtained by removing or plugging the jumper J14 into pins 1 and 2 and is used to implement following additionnal functions:
  - the LD4NX RJ card in LD4X mode uses the junction assigned to its slot, there are no more restrictions concerning card installation rules,
  - hardware information of the card can be displayed by MMC (an EEPROM is installed on the LD4NX RJ card in LD4X mode),
  - you can declare up to 10 LD4NX RJ cards in LD4X mode on a NeXspan L,
  - the remote power supply status of LD4NX RJ card S0 accesses in LD4X mode can be displayed as soon as the card is in service.

4.6.1 Description of the connectors

LABEL	FUNCTIONS/CHARACTERISTICS	CONTACTS
J1	96-pin connector: backplane connection.	
J4 	HE14 connector - 1 x 8 male pins: used for loading programmable components "On Site" (reserved for manufacturer).	not used
J5 and J6 	Two connectors AMP CMS 2 x 10 female pins: hosts an ADPCM16V daughter card. Caution: the ADPCM8V daughter card is not managed by the LD4NX RJ card.	
console	RJ45 -8 pin connectors: debug console, reserved for manufacturer.	
S0 to S3	RJ45 -8 pin connectors: connection to S0 interface.	(1)
T0 to T3	RJ45 -8 pin connectors: connection to T0 interface.	(1)

(1) See the details of the connections in Table 16:.

Table 15: Description of LD4NX RJ card connectors

- S0 connector pinout on the LD4NX RJ card: check that signals match pins.

	LINE NO.			
Pin No.	S3	S2:	S1	S0
1				
2				
3	RD3	RD2	RD1	RD0
4	ED3	ED2	ED1	ED0
5	NED3	NED2	NED1	NED0
6	NRD3	NRD2	NRD1	NRD0
7				
8				

Table 16: S0 connector pinout on the LD4NX RJ card

Caution: The ISDN 40V mains is supplied by the XL PBX backplane (provided the ADS300X power supply unit with ISDN 40V is installed, ref: HR6953D).

4.6.2 Switch settings

Note: *The Master/Slave micro-switch of previous LD4 cards no longer exists. The LD4NX RJ card is always in DECT slave mode; it cannot generate the DECT clock.*
The LD4NX RJ card has no micro-switch for downloading the flash memory with a BOF3 type tool (automatic detection).

- Micro-switch **CA1** (HVAL) is used to configure synchronization (T0).

MICRO-SWITCH CA1 (HVAL)	EXPLANATION
ON	Leave set to ON position. If the LD4NX RJ card is fitted in a synchronising slot, the ON position allows the PBX to take the ISDN network clock as reference clock. In a non-synchronising slot, CA1 has no impact. The synchronising positions in an XL cabinet are slots 1-00 to 1-05. For an XS cabinet, all positions are synchronising. On XS12, the backplane does not transmit the network synchronisation (synchronising slots are T0 interfaces built into the UCT card).
OFF	Do not set it to OFF position (in OFF position, the ISDN clock is not taken as reference, whatever the slots).

Table 17: Description of the CA1 switch on the LD4NX RJ card

- Jumpers **J1_1, J1_2, J1_3 and J1_4** are used to enable the remote power supply (40 V or 48 V) of each interface where an S0 interface is connected:

Caution: In T0, remove the jumpers (conflict between the 48 V supplied by the system and the 40V supplied by the public exchange).

  - J1_1: Remote power supply for interface 0
  - J1_2: Remote power supply for interface 1
  - J1_3: Remote power supply for interface 2
  - J1_4: Remote power supply for interface 3

Note: *J2_1, J2_2, J2_3 and J2_4 are storage positions for jumpers.*

- A jumper positioned on **SW5** or **SW6** is used to select the 40 V or 48 V remote mains supply.
  - Jumper positioned on SW5 (factory position) is used to select the 48 V power supply.
  - Jumper positioned on SW6 is used to select the 40 V power supply.

Note: *The jumper status of remote supply and synchronization for an LD4NX ST card in LD4X mode can be displayed by MMC (menu 3-2-4, "ISDN board switches status", see Figure 4-18).*

- Jumper J14 is used to select the card's operating mode (LD4N or LD4X) :
  - leave the jumper in factory position 2-3 for a LD4N configuration,
  - plug the jumper into pins 1 and 2 or remove the jumper for a LD4X configuration used to implement additionnal functions.

4.6.3 Description of the diodes

LABEL	STATUS	EXPLANATION
RUN (green)	Flashing rapidly	Card in service
OFF (orange)	ON	Card can be removed while powered up

Table 18: Description of LD4NX RJ card LEDs

Note: *You are advised to disable the card before removing it.*

4.6.4 Description of push buttons

LABEL	EXPLANATION
RST	Resets the card
NMI	Factory-reserved

Table 19: Description of LD4NX RJ card push buttons

4.6.5 Position of LD4NX RJ card

The possible slots and restrictions for the LD4NX card (RJ45 format) in a NeXspan cabinet are the same as for the LD4 card.

Caution: The restrictions concerning installation of LD4 and LD4NX cards in LD4N mode do not exist for LD4NX card in LD4X mode.

Note: *The LD4NX RJ card can be hot-plugged/removed in an operational XL, rackable XS or rackable XS12 PBX.*

Layout in a NeXspan L (main cabinet only)

<table>
<tr><td colspan="2">UCT-L</td><td rowspan="8">ADS300X</td></tr>
<tr><td>01</td><td>00</td></tr>
<tr><td>03</td><td>02</td></tr>
<tr><td>05</td><td>04</td></tr>
<tr><td>07</td><td>06</td></tr>
<tr><td>09</td><td>08</td></tr>
<tr><td>11</td><td>10</td></tr>
<tr><td>13</td><td>12</td></tr>
</table>

Figure 4-10: Slot numbers on the backplane of an XL switch

An LD4 or LD4NX card (in LD4N or LD4X mode) without ADPCM16 daughter card can be fitted in slots 0X0 to 13.

An LD4N card in LD4X mode with ADPCM16 daughter card can be fitted in slots 00 to 13 without restriction.

An LD4/LD4NX card (in LD4N mode) with ADPCM16 daughter card can be fitted in slots 6 and 7 without restriction. It is not allowed in slots 08 to 13.

When an LD4/LD4NX + ADPCM16 card is fitted in slot 00, no card on the short list may be fitted in slot 08; when an LD4/LD4NX + ADPCM16 card is fitted in slot 01, no card on the short list may be fitted in slot 09; when an LD4/LD4NX + ADPCM16 card is fitted in slot 02, no card on the short list may be fitted in slot 10; when an LD4/LD4NX + ADPCM16 card is fitted in slot 03, no card on the short list may be fitted in slot 11; when an LD4/LD4NX + ADPCM16 card is fitted in slot 04, no card on the short list may be fitted in slot 12; when an LD4/LD4NX + ADPCM16 card is fitted in slot 05, no card on the short list may be fitted in slot 13.

Short list: LA8, LN8, LM8, LH8, LI1, LR4, CP1, 8-channel PT2, 16-channel PT2, LD4, LD4NX, MUM, IUMS.

Note: *Synchronising positions are positions 00 to 05. H0 in position 00 has priority over H1, H2, H3, H4 and H5 which have the same priority.*

Layout in a NeXspan S (main cabinet only)

02	01	00
UCT-S		

Figure 7-11: Slot numbers on the backplane of an XS switch

An LD4/LD4NX card with or without ADPCM16 daughter card can be fitted in slots 00, 01 and 02.

Note: *The three slots are synchronising positions. H0 in position 00 has priority over H1, H2 and H3 (retrieved from the T0 interfaces built into the UCT-S card) which have the same priority.*

Layout in a NeXspan S12 (no expansion cabinet)

- Non rackable NeXspan S12: as standard, no expansion cards (optional backplane),
- Rackable NeXspan S12: 3 slots numbered from 00 to 02.

02	01	00
UCT3S-12		

Figure 7-12: Slot numbers on the backplane of an XS12 switch

An LD4/LD4NX card (in LD4N or LD4X mode) with or without ADPCM16 daughter card can be fitted in slots 00, 01 and 02.

Note: *On XS12, the backplane does not transmit the network synchronisation (synchronising slots are T0 interfaces built into the UCT card. Consequently, the XS12 cannot accept LT2, LD4, LD4NX type synchronising cards with the T0 function.*

4.6.6 Connecting base stations

Each base station is connected to the ISDN S0 (BRI) interface of an LD4NX RJ card, and uses two pairs: 1 transmit pair and 1 receive pair.

Note: *If there are a DECT base station and an S0 terminal (other than the base station) on the same card, the base station must be powered with a 40 V supply.*

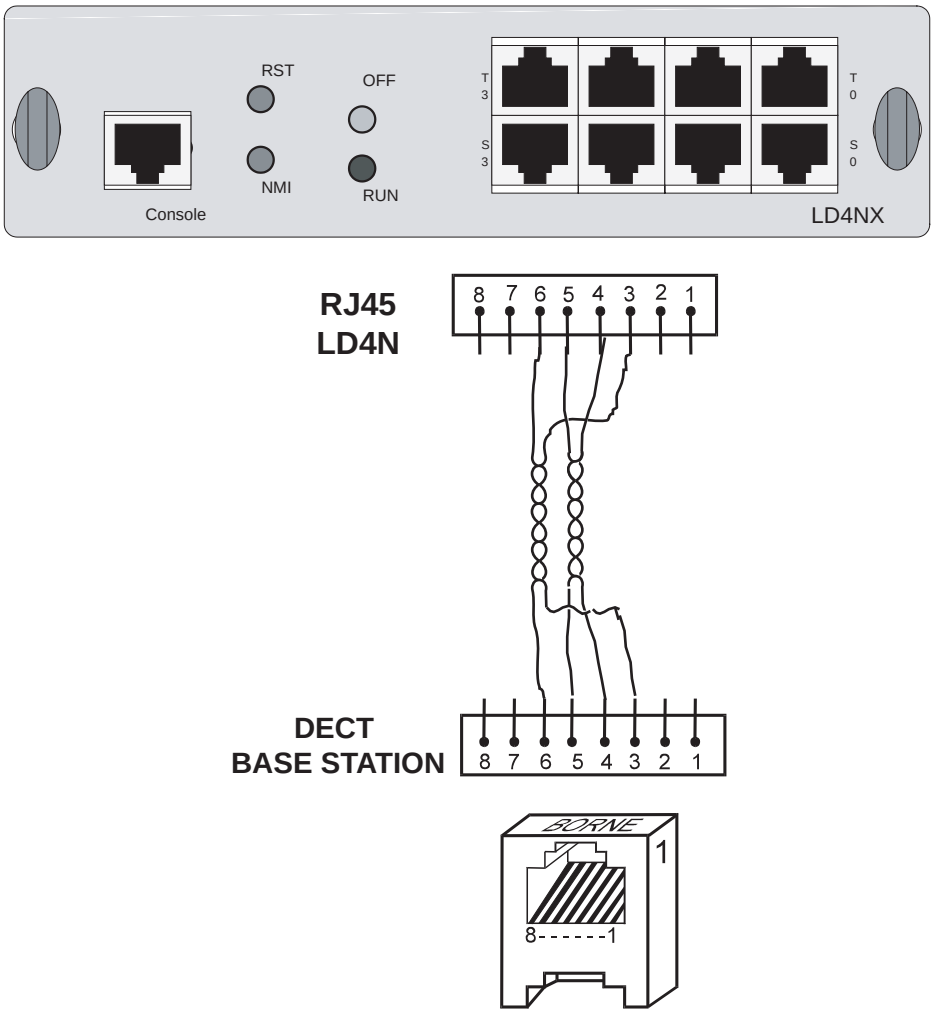


Figure 4-13: Connecting a base station to an S0 interface of an LD4NX RJ card

S0 interface link with DECT base station:

LD4NX RJ card RJ45 connector	Base station RJ45 connector
Pin 6 (NRD1)	Pin 6
Pin 3 (RD1)	Pin 3
Pin 5 (NED1)	Pin 5
Pin 4 (ED1)	Pin 4

Table 20: S0 interface link of an LD4NX RJ card with a DECT base station

4.7 Configuring S/T accesses of UCT-S, UCTS-12 and UCT-C cards

4.7.1 S/T access of a UCT-S card

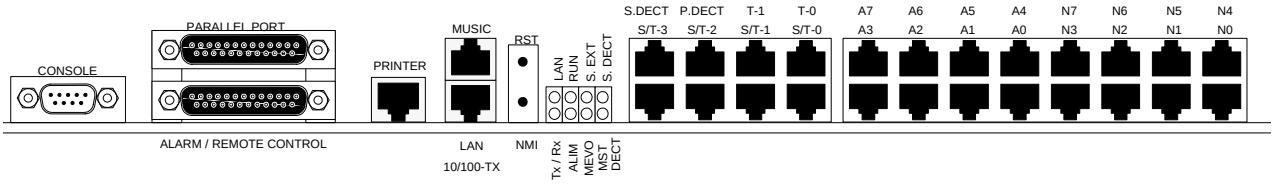


Figure 4-14: Front panel of a UCT-S card

The UCT-S card has four T0/S0 interfaces (4 RJ45 connectors) for connecting four 2-channel DECT base stations (on UCT1-S first generation card) and 4-channel (on UCT2-S seconde generation or UCT3-S third generation card equipped with an ADPCM16 daughter card).

4.7.2 S/T access of a UCTS-12 card

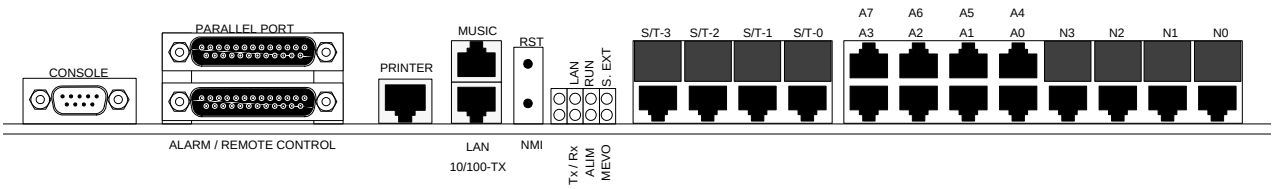


Figure 4-15: Front panel of a UCTS-12 card

The UCTS-12 card has four T0/S0 interfaces (4 RJ45 connectors) for connecting four 2-channel DECT base stations (on UCT1S-12 first generation card) and 4-channel (on UCT2S-12 seconde generation or UCT3S-12 third generation card equipped with an ADPCM16 daughter card).

4.7.3 S/T access of a UCT-C card

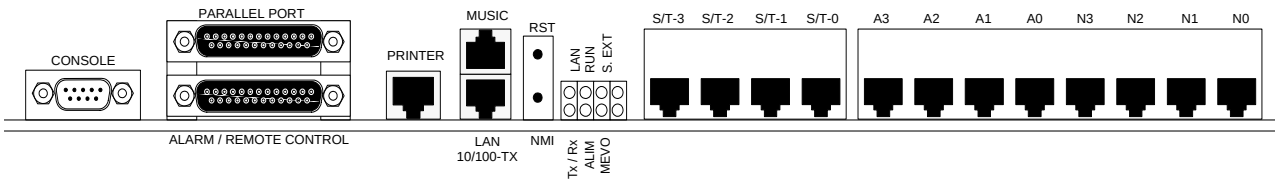
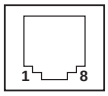


Figure 4-16: Front panel of a UCT-C card

The UCT-C card has four T0/S0 interfaces (4 RJ45 connectors) for connecting two 2-channel DECT base stations (on UCT1-C first generation card) and 4-channel (on UCT2-C seconde generation card equipped with an ADPCM16 daughter card).

4.7.4 Description of S/T connectors of UCT-S, UCTS-12 and UCT-C cards



Pin no.	S/T3	S/T2	S/T1	S/T0
1	NC	NC	NC	NC
2	NC	NC	NC	NC
3	ED3	ED2	ED1	ED0
4	RD3	RD2	RD1	RD0
5	NRD3	NRD2	NRD1	NRD0
6	NED3	NED2	NED1	NED0
7	NC	NC	NC	NC
8	NC	NC	NC	NC

Table 21: Pinout of S/T connectors on UCT-S, UCTS-12 and UCT-C cards

Note: *The default pinout is set to connect T0 accesses directly (straight cable). A twisted cable or T0/S0 adaptor is required to connect DECT base stations.*

4.7.5 Configuring the remote power supply of S/T0 to S/T3 accesses

UCT-S, UCTS-12 and UCT-C cards have 4 jumpers for configuring the remote power supply of the S/T0 to S/T3 accesses (one jumper block for each access). The jumpers are plugged into connectors J29 and J30 on the front of the UCT-S, UCTS-12 and UCT-C cards. The 4 accesses are arranged vertically on the card. The one at the bottom is the S/T0 access and the one at the top the S/T3 access. Depending on the position of the jumpers, the S/T0 to S/T3 accesses will be configured as follows:

- No remote power supply
- 48 V power supply (DECT and S sets)
- 40 V power supply (option)

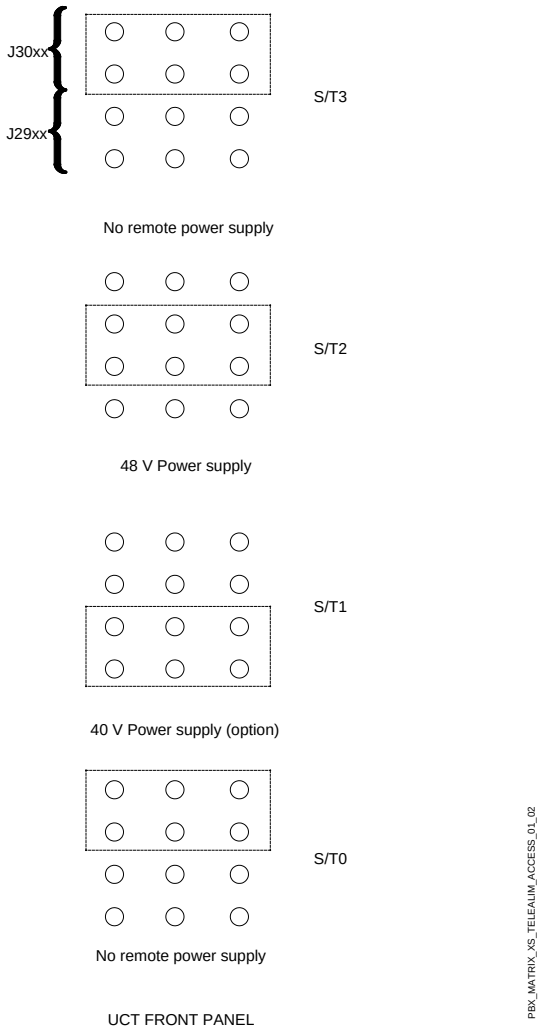


Figure 4-17: Configuring remote power supply of S/T0 to S/T3 accesses

The state of the jumpers can be viewed via MMC: Menu 3.2.4

```
ISDN BOARD SWITCHES STATUS

     SLOT       TYPE    DIREC/TG     SYNC  REMO-SUPL
     ------------------------------------------------

     0-02-00    S0       300          YES   YES
     0-02-01    DECT     BASE TG0     YES   YES
     0-02-02    T0       FT0-ETSI     YES   NO
     0-02-03    T0       FT0-ETSI     YES   NO
     1-01-00    S0       310          YES   40V
     1-01-01    S0       311          YES   NO
     1-01-02    S0       312          YES   NO
     1-01-03    S0       313          YES   40V
```

Figure 4-18: Status of ISDN card jumpers (Menu 3.2.4)

Note: *The jumper status of LD4NX cards in LD4X mode equipped in the PBX are also displayed (in this example, the card is equipped in slot 1-01).*

4.7.6 Connecting base stations

Each base station is connected to an ISDN S0 (BRI) interface of a UCT-S/UCTS-12/UCT-C card, and uses two pairs: 1 transmit pair and 1 receive pair.

If several base stations are connected to the S0 accesses of a first generation UCT1-S/UCT1S-12/UCT-C card or if one base station is connected to one S0 access of an LD4, LD4NX card and another to an integrated S0 access of a first generation UCT1-S/UCT1S-12/UCT-C card, a third pair needs to be wired for synchronization (pins 1 and 2 of the base station RJ45 connector) (see section 4.8).

The S0 integrated accesses of seconde generation UCT2-S/UCT2S-12/UCT2-C cards and the S0 integrated accesses of third generation UCT3-S/UCT3S-12 cards manage the synchronisation by bit M frame S.

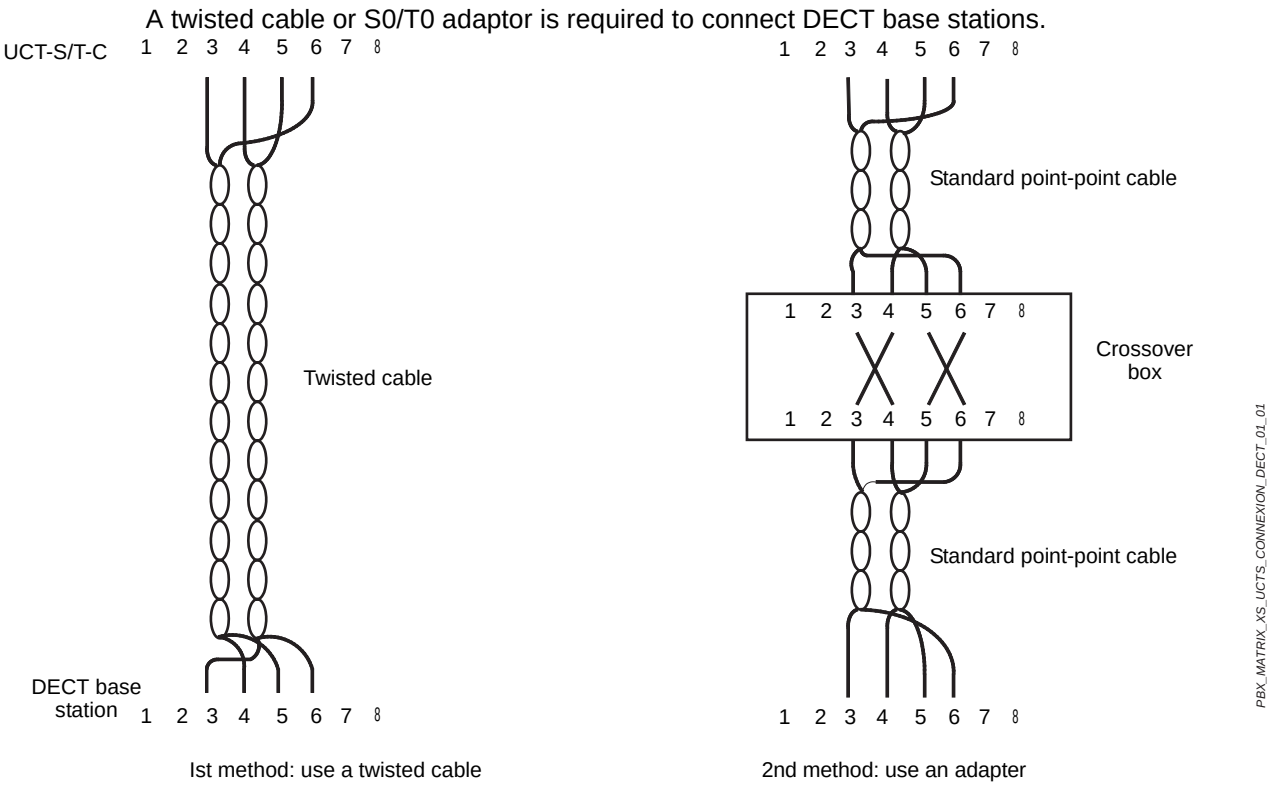


Figure 4-19: Connecting a DECT base station to an S0 access of a UCT-S/UCTS-12/UCT-C card

S0 interface link with DECT base station (twisted cable used)

UCT-S/UCT-C card RJ45 connector	Base station RJ45 connector
Pin 6 (NED1)	Pin 5
Pin 3 (ED1)	Pin 4
Pin 5 (NRD1)	Pin 6
Pin 4 (RD1)	Pin 3

Table 22: S0 interface link with DECT base station using a twisted cable

S0 interface link with DECT base station (adaptor used)

RJ45 connector UCT-S/UCT-C card	Adaptor connector	Base station RJ45 connector
Pin 6 (NED1)	Pin 6 => Pin 5	Pin 5
Pin 3 (ED1)	Pin 3 => Pin 4	Pin 4
Pin 5 (NRD1)	Pin 5 => Pin 6	Pin 6
Pin 4 (RD1)	Pin 4 => Pin 3	Pin 3

Table 23: S0 interface link with DECT base station using a point-to-point cable

4.8 Base station synchronization

DECT base stations connected to S0 accesses of an LD4/LD4NX card and to the S0 integrated accesses of seconde generation UCT2-S/UCT2S-12/UCT2-C or third generation UCT3-S/ UCT3S-12 cards are synchronized by the software, by the M bit of the S frame.

DECT base stations connected to integrated S0 accesses of a first generation UCT1-S/UCT1S-12/UCT1-C card are synchronized by a third pair.

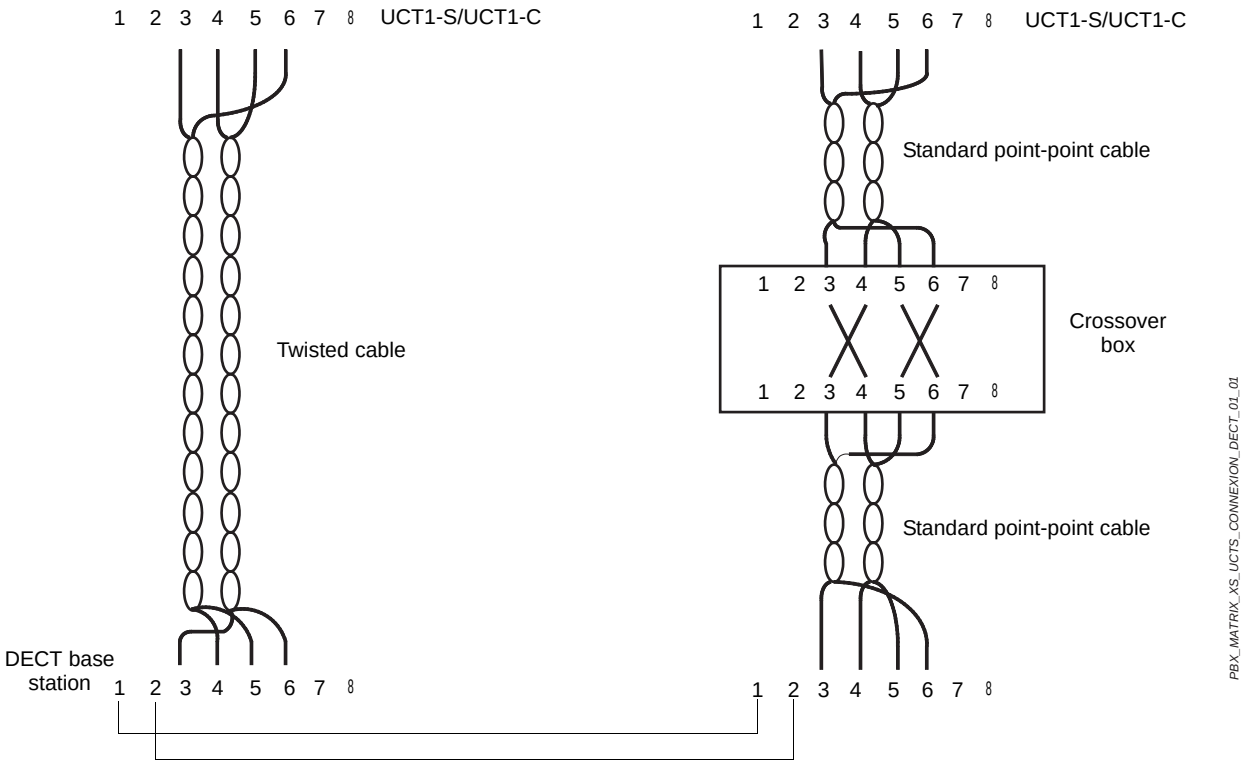


Figure 4-20: Connecting two DECT base stations to S0 accesses of a UCT1-S/UCT1S-12/UCT1-C card

When one DECT base station is connected to an S0 access of an LD4/LD4NX card and another base station is connected to an integrated S0 access of a first generation UCT1-S/UCT1S-12/ UCT1-C card, a third pair also needs to be wired for synchronization.

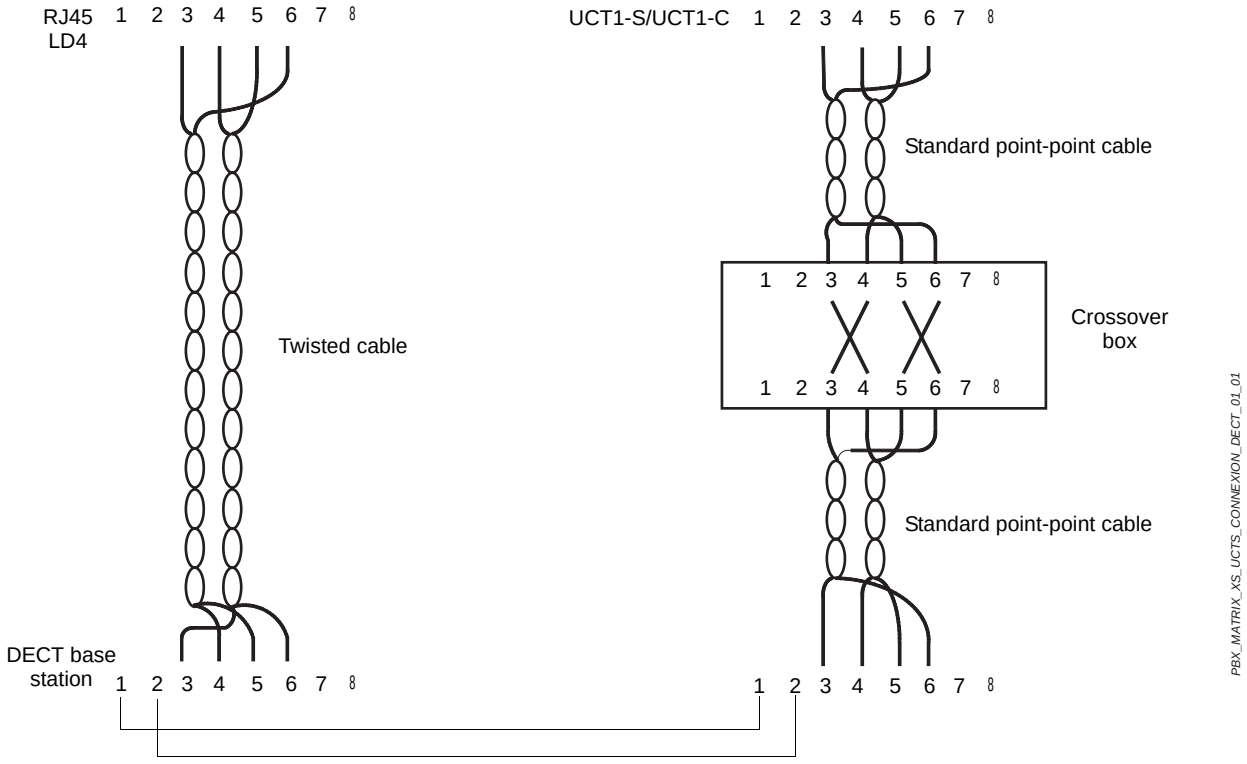


Figure 4-21: Connecting two DECT base stations to an S0 access of an LD4/LD4NX card and a UCT1-S/ UCT1S-12/UCT1-C card

In certain special cases (multi-site network with PBXs of different types, for example, or a multi-site network with several XSs whose base stations are connected to integrated S0 accesses of UCT1-S cards), a third pair may need to be wired for synchronization (pins 1 and 2 of the base station RJ45 connector); see the Chapter "Multi-site synchronization".

Note: *Multi-site DECT synchronization via third pair is not possible with NeXspan C and NeXspan S12.*

In a multi-site network with several NeXspan cabinets (XL/XS), synchronization is carried out from one or two PBXs declared "Master".

UCT-L (XL processor card) and UCT-S cards (XS processor card) have two RJ45 connectors for DECT synchronization: a primary port (J7A) and a secondary port (J7B) (see the Chapter "Multi-site synchronization").

Chapter 5 - Implementation of hardware on NeXspan 50

5.1 Interface card

LDS/LDT cards, possibly fitted with one or two ADPCM32 (LDS) and ADPCM32B (LDT) daughter cards are used to connect DECT base stations to a NeXspan 50.

LDS/LDT cards have T0/S0 interfaces for managing 2- or 4-channel DECT base stations. There are two versions of each card:

- LDSA/LDTA: 8 T0/S0 interfaces
- LDSB/LDTB: 16 T0/S0 interfaces

LDSA/LDTA cards allow sixteen 2-channel DECT base stations to be connected, and LDSB/LDTB cards eight 2-channel DECT base stations. 4-channel base stations can be connected by adding one or two daughter cards: ADPCM32 (on LDS) and ADPCM32B (on LDT). An ADPCM32/ADPCM32B card can manage eight 4-channel base stations.

Note: *The minimum technical state of the LDS card required to support an ADPCM32 card is: HJ4094xN02*

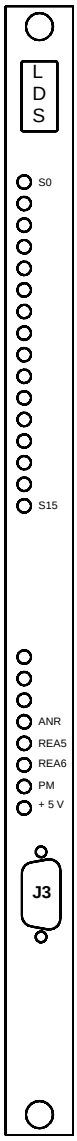
5.2 Configuring the LDS card

5.2.1 References and equipment

Designation		Reference
LDSA	16 T0/S0 interfaces for 2- or 4-channel DECT base stations	HJ4094A
LDSB	8 T0/S0 interfaces for 2- or 4-channel DECT base stations	HJ4094B
ADPCM32	Daughter card for managing 8 x 4-channel DECT base stations	HJ4402A
AVADQ	Synchronous bus link plug	HR5124B
AVLDT	Synchronous bus link plug	HR5124C
PLDS	40 V/48 V remote power supply card	HJ4206A
LDSA cable	LDSA-distribution frame link cable	HG4302A
LDSB cable	LDSA-distribution frame link cable	HG4302B

Table 1: References and equipment

5.2.2 Front panel



S0 to S15 Interface Activation Display (level 1)

ANR Address not recognised (Fault)

REA5 Rapid LED flashing --> Card operational

Slow LED flashing --> Card not operational

REA6 Not significant (LED off)

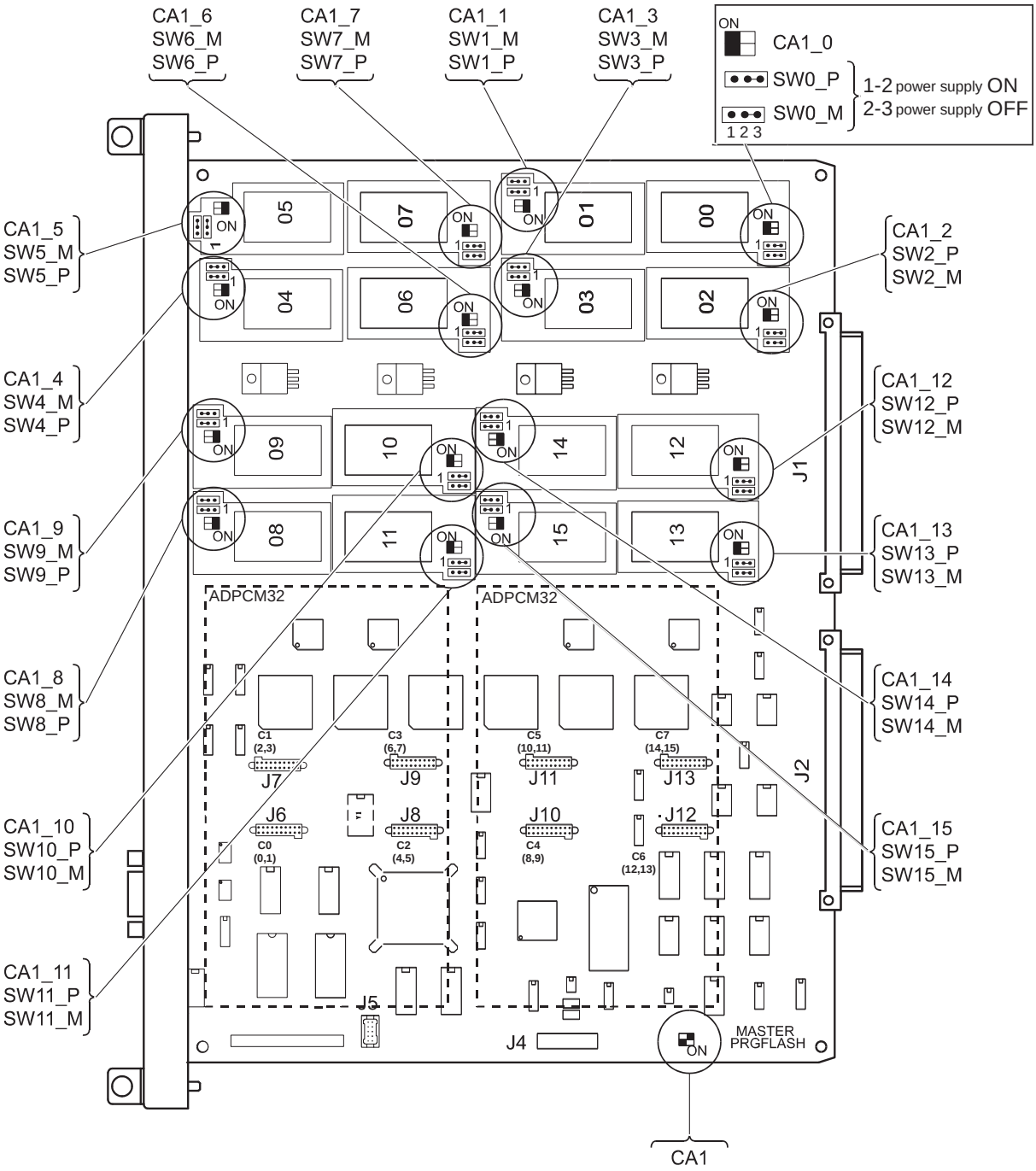
PM LED steady on--> Card operational

LED off --> Card not operational

+ 5 V Presence of + 5 V powering the card

Figure 5-1: Front panel of LDS card

5.2.3 Equipment on top side



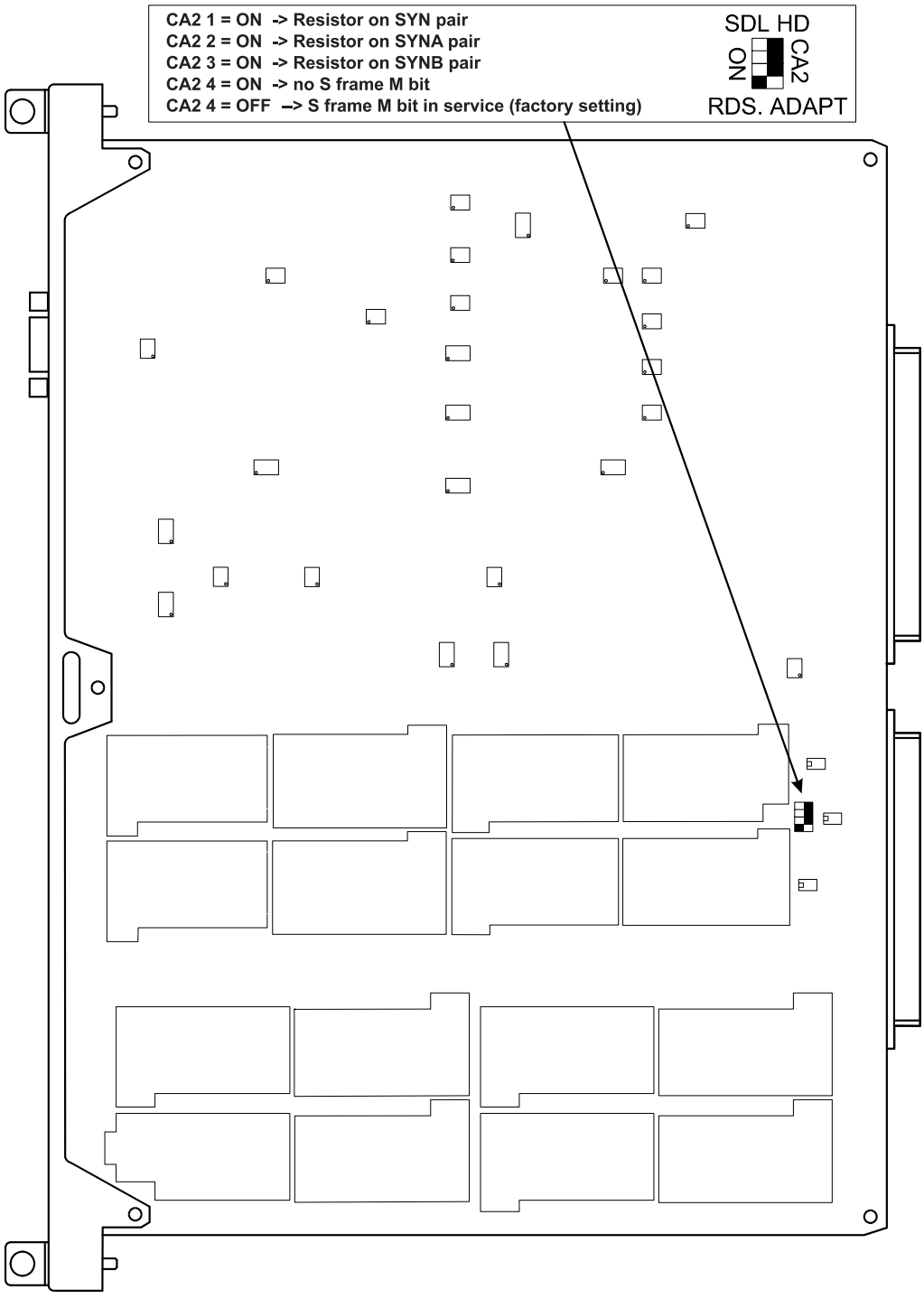
The black square represents the position of the switch.

J6, J7, J8, J9: ADPCM32 daughter card equipment

J10, J11, J12, J13: equipment of second ADPCM32 daughter card

Figure 5-2: Top view of the LDS card

5.2.4 Equipment on bottom side



The black square represents the position of the switch.

Figure 5-3: Bottom view of the LDS card

5.2.5 Switch settings

Flash Eprom programming switches

- CA1.2 = ON -> Flash Eprom programming (card not operational)
- CA1.2 = OFF -> Card operational **Mandatory Position**

100 Ohm adaptation straps

- CA1_i.1 = ON and CA1_i.2 = ON -> Access adapted 100 Ohms
- CA1_i.1 = OFF and CA1_i.2 = OFF -> Configuration for Y bus (do not use for base stations)

where i: Value from 0 to 15

Remote power supply configuration straps

- Swi_P* positioned at 1.2 = Remote power supply ON
- Swi_M* positioned at 1.2 = Remote power supply ON
- Swi_P* positioned at 2.3 = Remote power supply OFF
- Swi_M* positioned at 2.3 = Remote power supply OFF

where i: Value from 0 to 15

"_P" : + 40 V or +48 V

"_M" : - 40 V or -48 V

The two switches must be positioned on the same side: 1-2 or 2-3

DECT configuration switches

- Top side
  - CA1.1 = ON -> Master mode
  - CA1.1 = OFF -> Slave mode
- Bottom side
  - CA2.4 = ON -> no M bit in S frame
  - CA2.4 = OFF -> S frame M bit in service (base station synchronization) **Factory setting**

The CA2.4 switch must be set to OFF to operate with DECT base stations.

The CA2.4 switch set to ON enables use in CBT mode (transparent B channel) for videophones, routers and modems. In this case, there is no M bit in the S frame for all the card equipment and it is not possible to equip synschronised DECT base stations with the M bit.

V11 clocks have 100 ohms adaptation resistors that must be connected:

- CA2.1 = ON -> resistor on SYN pair
- CA2.2 = ON -> resistor on SYNA pair
- CA2.3 = ON -> resistor on SYNB pair

Note: *DECT base stations and S0 terminals cannot be combined on the same LDS board (DECT base station/S0 equipment combinations not allowed).*

5.2.6 LDS card layout

The LDS card can be fitted in the shelves in accordance with the configuration file. The card is connected to the synchronous bus via the AVADQ or AVLDT terminator inserted in a CFX front slot (corresponding to CLX slot on the LDS card).

For more detailed information, refer to document [12] in the reference documents.

The LDS card must be connected to a synchronising clock input in the PBX if a T0 interface is synchronising on the LDS card.

Each group of eight S interfaces must be connected to a complete junction (32 TS) on the synchronous bus of the NeXspan 50. The LDSA card thus requires two junctions.

Cards	CLX0	CLX1	CLX2	CLX3	CLX4	CLX5	CLX6
Junctions	J8 + J12	J9 + J13	J10 + J14	J24 + J28	J25 + J29	J26 + J30	J27 + J31
Capacity	8S (J8) 16S (J8, J12)	8S (J9) 16S (J9, J13)	8S (J10) 16S (J10, J14)	8 S (J24) 16 S (J24, J28)	8 S (J25) 16 S (J25, J29)	8 S (J26) 16 S (J26, J30)	8 S (J27) 16 S (J27, J31)

To synchronize the NeXspan 50, connect the ISDN clock extracted from a T0 access (synchronising T0 interface) to a 2.048 MHz clock input of the RSU.

5.2.7 Connecting the LDS card

The LDS card is connected to the distribution frame by a special cable, also used for the remote power supply connection and the RSU connection if a T0 interface is synchronising on the LDS card.

If there is no synchronising T0 on the LDS card, cable HG4301A or B is used.

The remote power supply connection requires a PLDS card used to retrieve the 40 V ISDN or the 48 V Subscriber on the back panel. The PLDS is positioned as an equipment card cable (LAJ,LAB etc.). It is inserted in a slot between the equipment cable and the back panel connector.

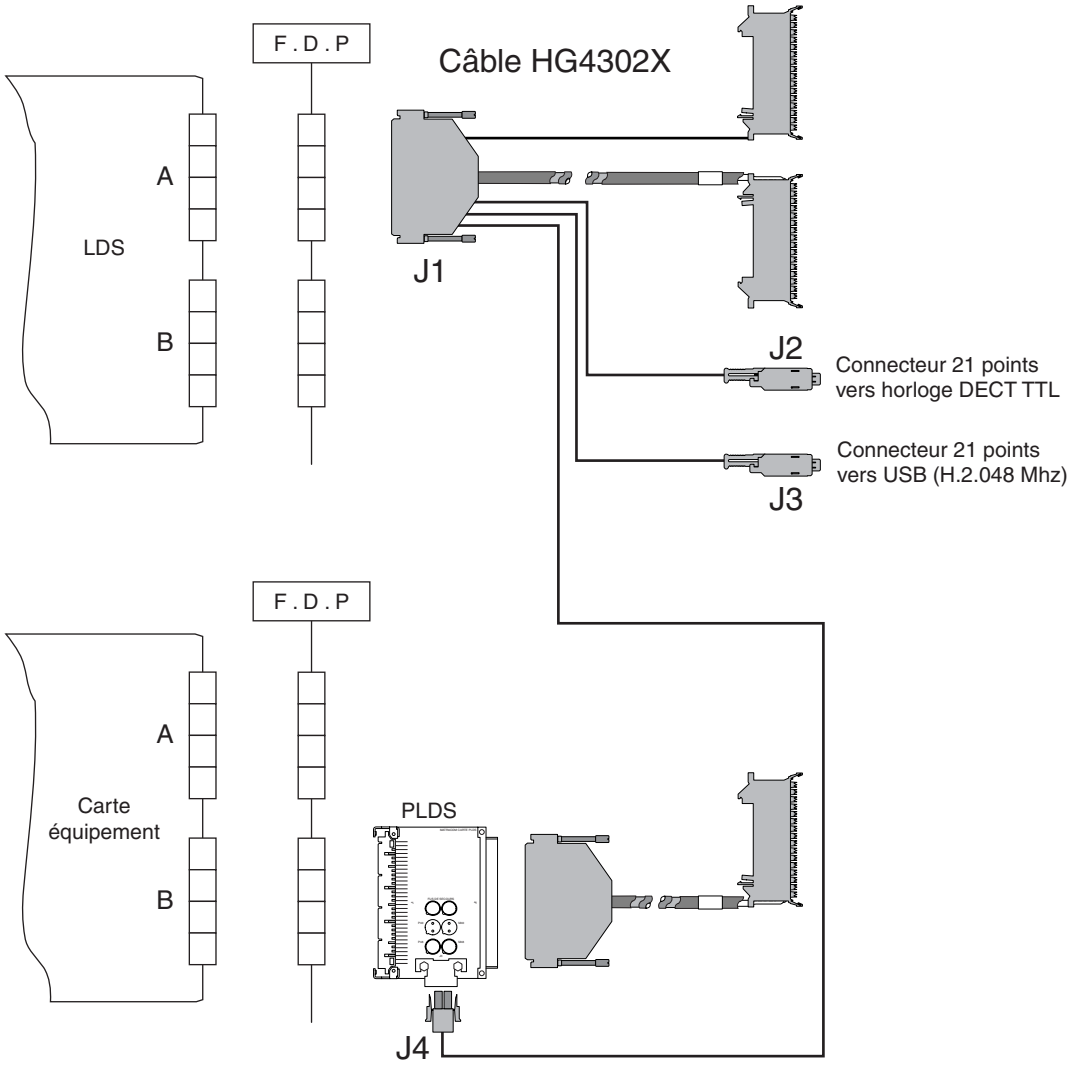


Figure 5-4: Connecting the LDS card

PLDS card

A PLDS card is required for each LDS card to be supplied with remote power. Fuses are positioned on the PLDS card to select either 40 V or 48 V voltage (48 V as standard unless an S0 interface supplied with remote power is to be configured on the card).

The remote power is supplied to the LDS card interfaces via the part of the cable terminating with the J4 connector.

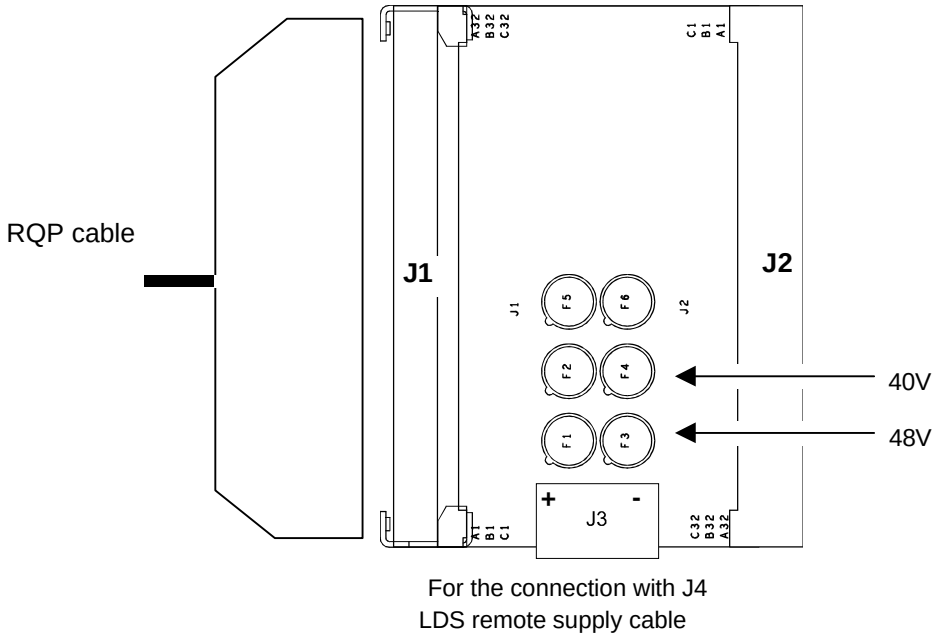
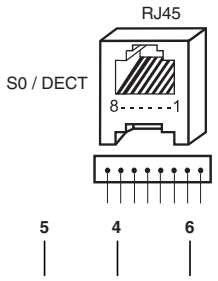


Figure 5-5: Connecting the PLDS card

5.2.8 Distribution frame wiring with cable HG4302A

On the distribution frame end the cable has:

- 4 yellow terminal strips (16 transmission/reception interfaces),
- 1 red terminal strip (DECT synchronization).



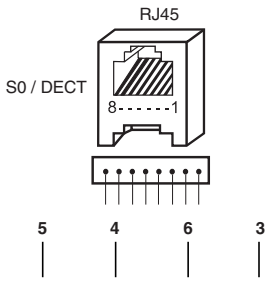
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) TRANSPARENT	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) TRANSPARENT	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) TRANSPARENT	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) TRANSPARENT	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) TRANSPARENT	NRD4 (C10) YELLOW	ED5 (B10) GRAY	NED5 (B11) BROWN	RD5 (C11) TRANSPARENT	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) TRANSPARENT	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) PURPLE	NRD7 (C14) BLUE
2G	ED8 (B14) ORANGE	NED8 (B15) YELLOW	RD8 (B12) PURPLE	NRD8 (B13) BROWN	ED9 (B16) ORANGE	NED9 (A16) BLACK	RD9 (C15) PURPLE	NRD9 (C16) RED	ED10 (A17) ORANGE	NED10 (A18) GREEN	RD10 (C17) PURPLE	NRD10 (C19) WHITE	ED11 (A19) ORANGE	NED11 (B22) BLUE	RD11 (B20) PURPLE	NRD11 (B23) YELLOW
3G	ED12 (B24) ORANGE	NED12 (B25) BROWN	RD12 (C23) PURPLE	NRD12 (C25) BLACK	ED13 (B26) ORANGE	NED13 (B27) RED	RD13 (C26) PURPLE	NRD13 (C27) GREEN	ED14 (A25) GRAY	NED14 (A26) WHITE	RD14 (A27) TRANSPARENT	NRD14 (A28) BLUE	ED15 (B28) GRAY	NED15 (B29) YELLOW	RD15 (C28) TRANSPARENT	NRD15 (C29) BROWN
4G	SYNP RED	SYNN BLUE	SYNAP RED	SYNAN BLUE	SYNBP RED	SYNBN BLUE										SHIELD

Figure 5-6: Distribution frame wiring with cable HG4302A

5.2.9 Distribution frame wiring with cable HG4302B

On the distribution frame end the cable has:

- 2 yellow terminal strips (8 transmission/reception interfaces),
- 1 red terminal strip (DECT synchronization).



	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) TRANSPARENT	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) TRANSPARENT	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) TRANSPARENT	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) TRANSPARENT	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) TRANSPARENT	NRD4 (C10) YELLOW	ED5 (B10) GRAY	NED5 (B11) BROWN	RD5 (C11) TRANSPARENT	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) TRANSPARENT	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) PURPLE	NRD7 (C14) BLUE
4G	SYNP RED	SYNN BLUE	SYNAP RED	SYNAN BLUE	SYNBP RED	SYNBN BLUE										SHIELD

Figure 5-7: Distribution frame wiring with cable HG4302B

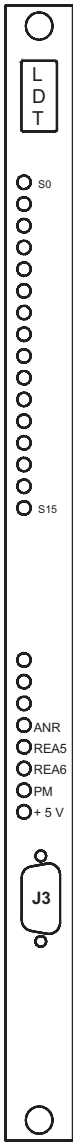
5.3 Configuring the LDT card

5.3.1 References and equipment

Designation		Reference
LDTA	16 T0/S0 interfaces for 2- or 4-channel DECT base stations	HJ4758A
LDTB	8 T0/S0 interfaces for 2- or 4-channel DECT base stations	HJ4758B
ADPCM32B	Daughter card for managing 8 x 4-channel DECT base stations	HJ4402B
AVADQ	Synchronous bus link plug (loop DECT clock recovery is not possible with this plug)	HR5124B
AVLDT	Synchronous bus link plug (loop DECT clock recovery is possible with FPHBG2 back plane)	HR5124C
PLDS	40V/48V remote power supply card	HJ4206A
LDTA cable	LDTA-distribution frame link cable	HG4302A
LDTB cable	LDTB-distribution frame link cable	HG4302B

Table 8: References and equipment

5.3.2 Front panel

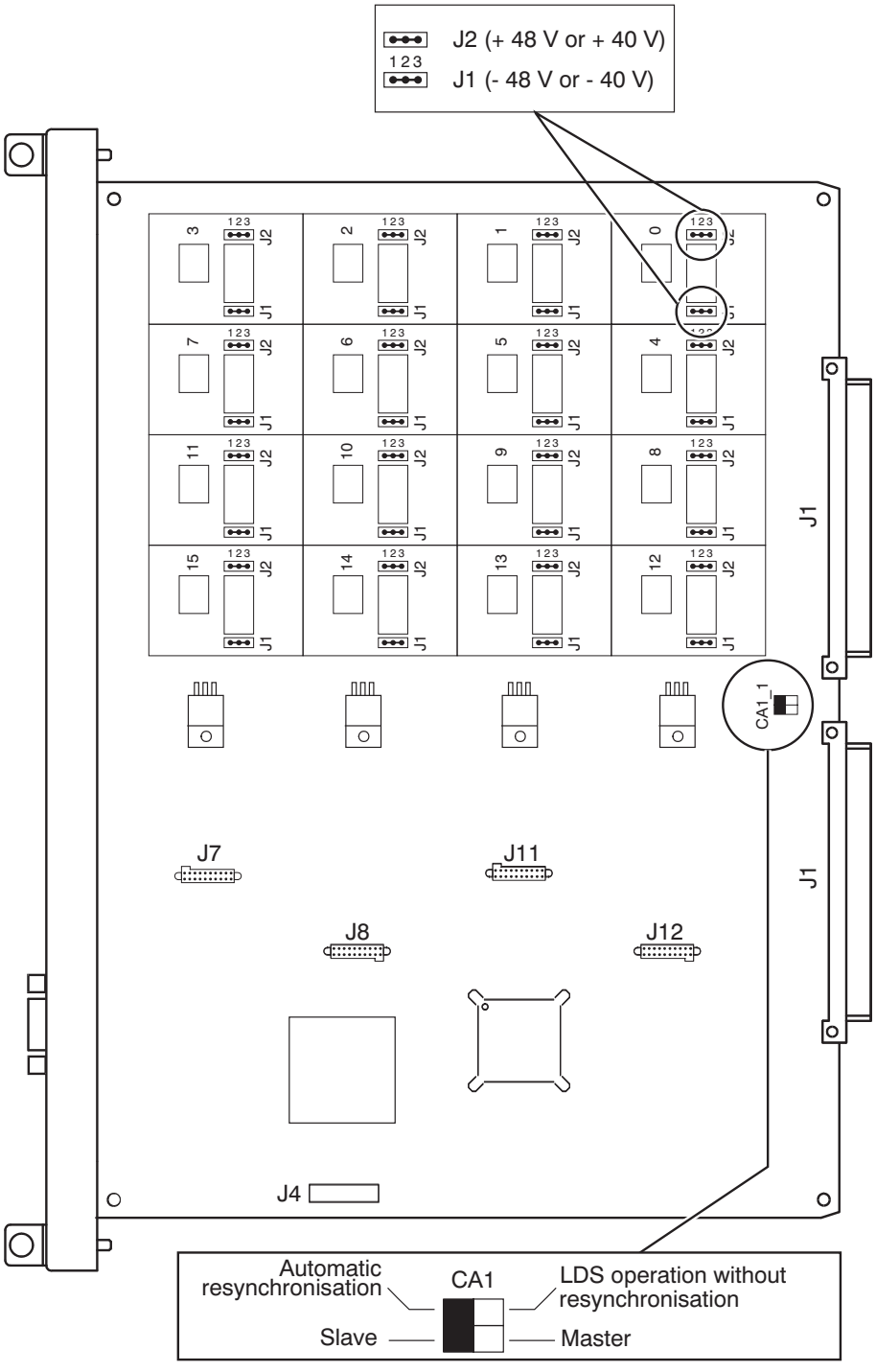


S0 to S15 Interface Activation Display (level 1)

ANR	Address not recognised (Fault)		
REA5	Rapid LED flashing	-->	Card operational
	Slow LED flashing	-->	Card operational
REA6	Not significant (LED off)		
PM	LED steady on	-->	Card operational
	LED off	-->	Card not operational
+ 5 V	Presence of + 5 V powering the card		

Figure 5-9: Front panel of LDT card

5.3.3 Equipment on top side



The black square represents the position of the switch.

J7, J8: ADPCM32B daughter card equipment

J11, J12: equipment of second ADPCM32B daughter card

Figure 5-10: Top view of the LDT card

5.3.4 Switch settings

Automatic resynchronization switch

CA1.2 = ON -> Automatic resynchronization

CA1.2 = OFF -> LDS operation without automatic resynchronization

Remote power supply configuration straps

- J1 set to 1-2 = Remote power supply ON
- J2 set to 1-2 = Remote power supply ON
- J1 set to 2-3 = Remote power supply OFF
- J2 set to 2-3 = Remote power supply OFF

J1: - 48 V or - 40 V

J2: +48 V or +40 V

The two jumpers must be positioned on the same side: 1-2 or 2-3.

DECT configuration switches

- CA1.1 = ON -> Slave mode
- CA1.1 = OFF -> Master mode

5.3.5 LDT card layout

The LDT card can be fitted in the shelves in accordance with the configuration file. The card is linked to the synchronous bus via the AVADQ plug (loop DECT clock recovery is not possible with this plug) or AVLDT plug (loop DECT clock recovery is possible with FPHBG2 back plane) connected in the front CFX position (corresponding to the position of CLX on the LDT card).

For more detailed information, refer to document [12] in the reference documents.

The LDT card must be connected to a synchronising clock input in the PBX if a T0 interface is synchronising on the LDT card.

Each group of 8 S interfaces must be connected to a complete junction (32 TS) on the synchronous bus of the NeXspan 50. The LDTA card thus requires two junctions.

Cards	CLX0	CLX1	CLX2	CLX3	CLX4	CLX5	CLX6
Junctions	J8 + J12	J9 + J13	J10 + J14	J24 + J28	J25 + J29	J26 + J30	J27 + J31
Capacity	8S (J8) 16S (J8, J12)	8S (J9) 16S (J9, J13)	8S (J10) 16S (J10, J14)	8 S (J24) 16 S (J24, J28)	8 S (J25) 16 S (J25, J29)	8 S (J26) 16 S (J26, J30)	8 S (J27) 16 S (J27, J31)

To synchronize the NeXspan 50, connect the ISDN clock extracted from a T0 access (synchronising T0 interface) to a 2.048 MHz clock input of the RSU.

5.3.6 Connecting the LDT board

The LDT card is connected to the distribution frame by a special cable, also used for the remote power supply connection and the RSU connection if a T0 interface is synchronising on the LDT card.

If there is no synchronising T0 on the LDT card, cable HG4301A or B is used.

The remote power supply connection requires a PLDS card used to retrieve the 40 V ISDN or the 48 V Subscriber on the back panel. The PLDS is positioned as an equipment card cable (LAJ,LAB etc.). It is inserted in a slot between the equipment cable and the back panel connector.

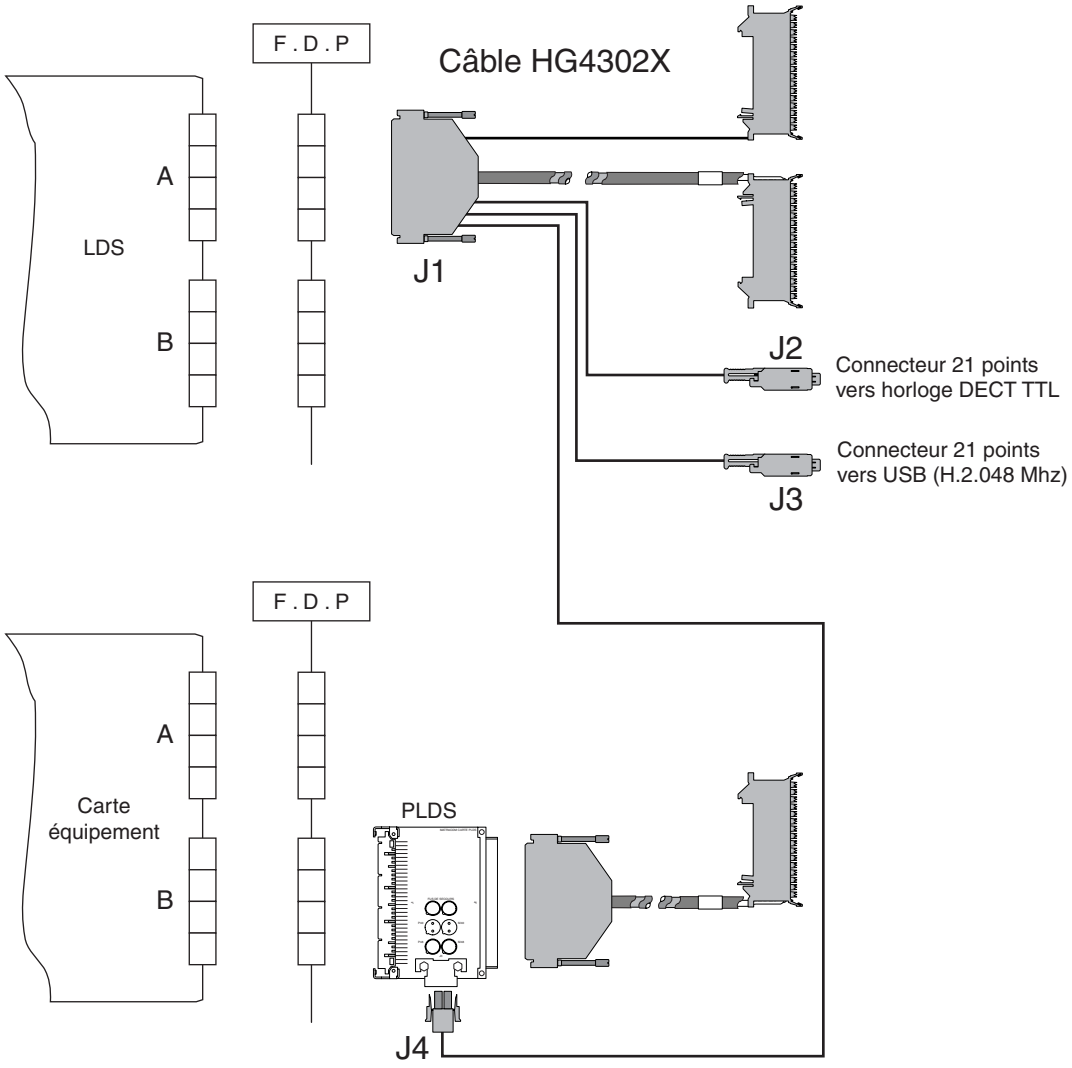


Figure 5-11: connecting the LDT board

PLDS card

A PLDS board is required for each LDT board to be remote supplied. Fuses are positioned on the PLDS card to select either 40 V or 48 V voltage (48 V as standard unless an S0 interface supplied with remote power is to be configured on the card).

The remote power is supplied to the LDT card interfaces via the part of the cable terminating with the J4 connector.

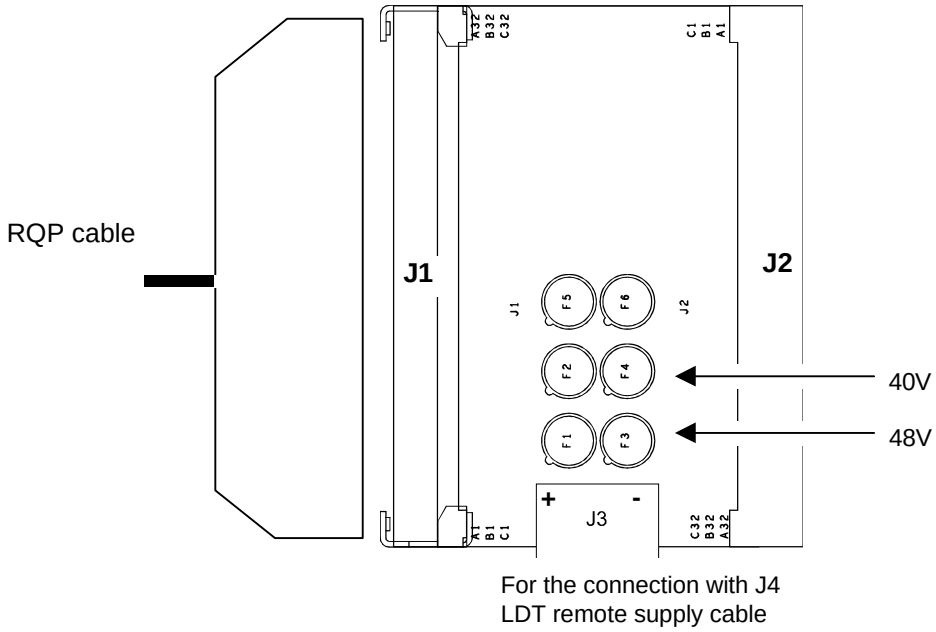


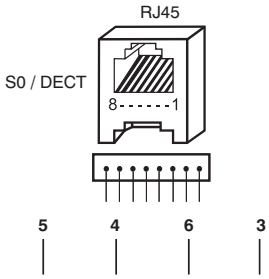
Figure 5-12: Connecting the PLDS card

5.3.7 Distribution frame wiring with cable HG4302A

On the distribution frame end the cable has:

- 4 yellow terminal strips (16 transmission/reception interfaces),
- 1 red terminal strip (DECT synchronization).

Note: *On an FPHBG2/CSI device, the synchronization signal is sent via the loop and transmitted to the LDT cards via the back plane (see Section 5.4).*



	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRIS	NED0 (A03) BLANC	RD0 (C02) INCOL	NRD0 (C03) BLEU	ED1 (B03) GRIS	NED1 (B04) JAUNE	RD1 (C04) INCOL	NRD1 (A04) MARRON	ED2 (B05) GRIS	NED2 (B06) NOIR	RD2 (C05) INCOL	NRD2 (C06) ROUGE	ED3 (A06) GRIS	NED3 (A07) VERT	RD3 (C07) INCOL	NRD3 (C08) BLANC
1G	ED4 (B08) GRIS	NED4 (B09) BLEU	RD4 (C09) INCOL	NRD4 (C10) JAUNE	ED5 (B10) GRIS	NED5 (B11) MARRON	RD5 (C11) INCOL	NRD5 (C12) NOIR	ED6 (A09) GRIS	NED6 (A10) ROUGE	RD6 (A11) INCOL	NRD6 (A12) VERT	ED7 (A13) ORANGE	NED7 (A14) BLANC	RD7 (C13) VIOLET	NRD7 (C14) BLEU
2G	ED8 (B14) ORANGE	NED8 (B15) JAUNE	RD8 (B12) VIOLET	NRD8 (B13) MARRON	ED9 (B16) ORANGE	NED9 (A16) NOIR	RD9 (C15) VIOLET	NRD9 (C16) ROUGE	ED10 (A17) ORANGE	NED10 (A18) VERT	RD10 (C17) VIOLET	NRD10 (C19) BLANC	ED11 (A19) ORANGE	NED11 (B22) BLEU	RD11 (B20) VIOLET	NRD11 (B23) JAUNE
3G	ED12 (B24) ORANGE	NED12 (B25) MARRON	RD12 (C23) VIOLET	NRD12 (C25) NOIR	ED13 (B26) ORANGE	NED13 (B27) ROUGE)	RD13 (C26) VIOLET	NRD13 (C27) VERT	ED14 (A25) GRIS	NED14 (A26) BLANC	RD14 (A27) INCOL	NRD14 (A28) BLEU	ED15 (B28) GRIS	NED15 (B29) JAUNE	RD15 (C28) INCOL	NRD15 (C29) MARRON
4G	SYNP (A03) ROUGE	SYNN (A02) BLEU	SYNAP (C09) ROUGE	SYNAN (C04) BLEU	SYNBP (C03) ROUGE	SYNBN (C02) BLEU										

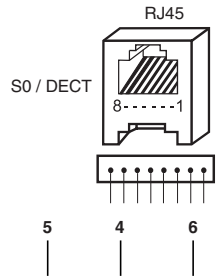
Figure 5-13: Distribution frame wiring with cable HG4302A

5.3.8 Distribution frame wiring with cable HG4302B

On the distribution frame end the cable has:

- 2 yellow terminal strips (8 transmission/reception interfaces),
- 1 red terminal strip (DECT synchronization).

Note: *On an FPHBG2/CSI device, the synchronization signal is sent via the loop and transmitted to the LDT cards via the back plane (see Section 5.4).*



	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) TRANSPARENT	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) TRANSPARENT	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) TRANSPARENT	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) TRANSPARENT	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) TRANSPARENT	NRD4 (C10) YELLOW	ED5 (B10) GRAY	NED5 (B11) BROWN	RD5 (C11) TRANSPARENT	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) TRANSPARENT	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) PURPLE	NRD7 (C14) BLUE
4G	SYNP RED	SYNN BLUE	SYNAP RED	SYNAN BLUE	SYNBP RED	SYNBN BLUE										SHIELD

Figure 5-14: Distribution frame wiring with cable HG4302B

5.4 synchronization

The DECT radio base station synchronization method varies with the device used (FPHBG2/CSI or FPHBG/CSH) and the boards installed (LDS and/or LDT). The back plane assembly FPHBG2/CSI and FPT30B/FPD30B allows the DECT clock to be sent on the loop and simplifies the DECT synchronization wiring in a single-site configuration.

5.4.1 For a NeXspan 50 equipped with an FPHBG2 back plane as well as CSI and LDT boards

The CSI board generates a DECT clock and sends this clock to all the PBX clusters. The synchronization signal is sent via the loop and extracted by the RMH boards. The DECT synchronization signal is then sent to the LDT boards via the back plane.

Hardware specifications

- The PBX is equipped with a CSI card and an FPHBG2 back plane.
- Only the LDT cards are used to connect base stations.
- Clusters with LDT cards are equipped with FPD30B or FPT30B back planes.
- These same clusters are fitted with RMH cards, ref.: HJ3773BD03 (minimum index for transmitting the DECT clock on the loop) for sending the DECT clock.
- The plugs used with the LDT cards are AVLDT plugs (ref HR5124C).

Configuration

- The DECT base stations must be configured in synchronization mode by the M bit.
- All the LDT cards must be configured as "Slaves" ("Master"/"Slave" mode can be configured via jumper CA1.1).
- For co-located clusters: there is no transmission delay on the loop. The setting is the same on all the RMH cards, V=1. Therefore, the switches must be configured as follows (factory configuration):
  CA3-3 and CA3-4 = OFF
  CA2 + CA1+ CA3-1,2 = ON
  Binary value: ON = 0 ; OFF = 1

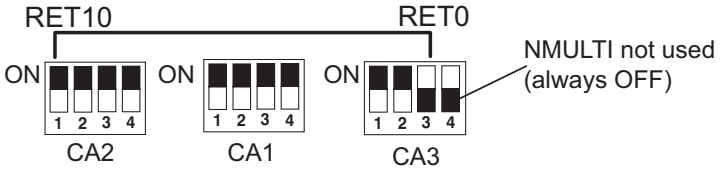


Figure 5-15: Default configuration (factory configuration) of switches CA1, CA2, CA3 on the RMH card (V= 1)

- For remote clusters: the transmission time compensation on the loop must be configured in the RMH board(s) of all the clusters that contain LDT boards to which DECT base stations are connected. This configuration is performed using 11 switches (binary value : ON = 0; OFF = 1)
  - for a coaxial loop (each switch = step of 12 meters) :

Distance (in meters)	RET11	RET10	RET9	RET8	RET7	RET6	RET5	RET4	RET3	RET2	RET1	RET0
0 à 12	on	on	on	on	on	on	on	on	on	on	on	on
12 à 24	on	on	on	on	on	on	on	on	on	on	on	**OFF**
24 à 36	on	on	on	on	on	on	on	on	on	on	**OFF**	on
36 à 48	on	on	on	on	on	on	on	on	on	on	**OFF**	**OFF**
.....												
192 à 204	on	on	on	on	on	on	on	**OFF**	on	on	on	on
204 à 216	on	on	on	on	on	on	on	**OFF**	on	on	on	**OFF**
216 à 228	on	on	on	on	on	on	on	**OFF**	on	on	**OFF**	on
228 à 240	on	on	on	on	on	on	on	**OFF**	on	on	**OFF**	**OFF**
.....												

  - For a fibre-optic loop, the value to be configured is given with the formula:

$$V = \frac{L \times 5,5 + (N+1) \times 40}{61}$$

L = total length (in meters) of cable or fiber sections from the USB.
N = number of clusters between the USB and the cluster for which the calculation is made.

- For the DECT clock to be transmitted correctly on the loop, switches CA1, CA3 and CA4 on the CSI card must be configured as follows (factory configuration):
  Default configuration (factory configuration) of switches CA1, CA3, and CA4 on the CSI card

CA1 + CA3 + CA4 = ON
Binary value : ON = 0 ; OFF = 1

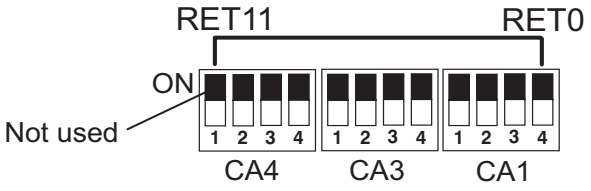


Figure 5-16 : Default configuration (factory configuration) of switches CA1, CA3, CA4 on the CSI card

5.4.2 For a NeXspan 50 equipped with an FPHBG back plane as well as CSH and LDS/LDT cards

The LDS/LDT card manages DECT synchronization by sending the 800ms time signal to DECT base stations on the S0 interface (M bit multi-frame mechanism of the S interface).

LDS/LDT cards have two operating modes (configured via jumper CA1.1):

- Master Mode
- Slave Mode.

When there are several LDS/LDT cards in a NeXspan 50 equipped with FPHBG/CSH, the LDS/LDT cards must be synchronized: an LDS (or LDT) card must be configured as "Master" and provide the synchronization signal. Other cards are configured as "Slaves".

Hardware specifications

- The PBX is equipped with a CSH card and an FPHBG back plane.
- Only the LDS or LDT cards are used to connect base stations.
- Clusters with LDS or LDT cards are equipped with FPD30 or FPT30 back planes.

Configuration

- An LDS (or LDT) card is configured as Master (via jumper CA1.1). The LDS (or LDT) card generates a clock from the synchronous bus clocks. This clock conforms with the one specified for DECT synchronization. From this clock, the LDS (or LDT) card sends the DECT time signal (M bit) to the S interfaces and physically provides three outgoing clocks in V11 differential pairs: SYN, SYNA and SYNB.
- The other LDS (and/or LDT) cards on the device are configured as slaves. The LDS (and/or LDT) cards use the clock received on the SYN pair and regenerate it on the two outbound clocks, SYNA and SYNB.
  In an NeXspan 50 (single-site or multi-site) with a single radio coverage, one LDS (or LDT) card must be configured as master and the others as slaves.
- If the DECT clock is cut off and both types of card, LDS and LDT, are used in the same FPHBG/CSH device to connect DECT base stations, the LDT boards must be configured (via the jumper CA1) in manual resynchronization mode.

Note: *If the LDT board is configured in automatic resynchronization mode (LDT boards in the device only), it switches to resynchronization mode when a "phase skip" or "no signal" error is detected. During this phase, the signal received is analyzed and, if correct for 50 seconds, the 800 ms counter is reset to the HRAD signal received. If the error continues to be detected during the resynchonization phase, the 800 ms counter setting is not adjusted.*

Connecting the clocks

Cable HG4302X is used to connect the DECT clock (800ms). This clock exits on 3 different V11 pairs (see LDS, LDT interfaces). All DECT V11 clock connections should be carried out on the 4G terminal strip.

- Incoming (slave card)/outgoing (master card) DECT clock: SYNP (polarity +), SYNN (polarity -).
- Outgoing DECT A clock: SYNAP (+), SYNAN (-).
- Outgoing DECT B clock: SYNBP (+), SYNBN (-).

If LDS (and/or LDT) cards are connected in the same PBX, it is advisable to use the PCM jumper.

If LDS (and/or LDT) cards are connected in a multi-site network, it is advisable to use an L904 cable.

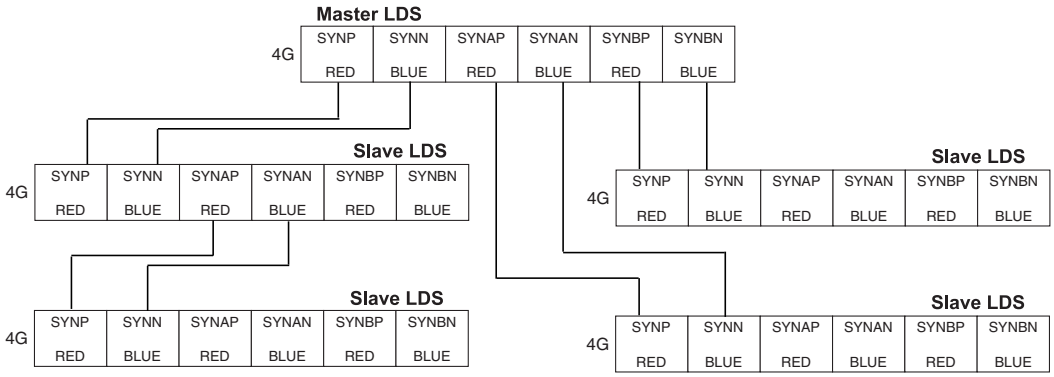


Figure 5-17: Connecting LDS (and/or LDT) cards in a multi-site network

5.5 LDT/LDS card diagnosis means on NeXspan 50

The method used to check that the LDT/LDS card configuration and the DECT synchronization clocks wiring are correct, rests on the contents reading of some accesssibles registers on these cards.

The accessible registers are not the same ones for LDT and LDS card.

The command vport must be used under "enter command" prompt with following syntax

VPORT ADR=aaaa GP=xx CLX=y

with: aaaa=register I/O address
xx=cluster number
y=LDT/LDS card number

5.5.1 Register content reading of LDT card

REGISTER CFG

I/O Address= 5010H

Bit 7							Bit 0
0	SPH	ABSHDECT	POLHRAD	NF1	0	0	NF0

NF0=1 : new daughter card of signal treatment presents (channel 0-7)

NF1=1 : new daughter card of signal treatment presents (channel 8-15)

SPH=1 : advance or delay superiors at 16 periods of the bit clock .

POLHRAD=1 : bad DECT clock polarity

ABSHDECT=1 : DECT clock not available in entry of LDT card.

Note: *the bits SPH , POLHRAD et ABSHDECT are reset by register reading.*

REGISTER RNBRESYNC

I/O Address= 5032H

Register NBRESYNC gives the number of times that LDT card switches to resynchronization mode. Its maximum value (FFH) is preserved once reached as long as this register is not read again.

Note : *This register is incremented only if LDT card is in automatic resynchonisation mode. The reading of this one gives to zero the meter*

REGISTER RFEN

Register RFEN, accessible in reading only, contains the localization code of the card. Its content is the code cabled in back plane, that is to say the reverse of the CLX number used for the recognition of the bus system orders.

I/O Address= 503CH

bit 7							bit 0
RESYNC AUTO	MASTER	NA/B	0	NADR11	NADR10	NADR9	NADR8

NADR11 .. NADR8 = Etat des entrées fixant le numéro de la position CLX .

NA/B=0 : LDT card equipped with 16 interfaces
NA/B=1 : LDT card equipped with 8 interfaces

MASTER=1 : LDT provides DECT clock (master)

RESYNCAUTO=1 : LDT is in automatic resynchonisation mode

5.5.2 Content reading of LDS card registers

REGISTER RFEN

Register RFEN, accessible in reading only, contains the localization code of the card. Its content is the code cabled in back plane, that is to say the reverse of the CLX number used for the recognition of the bus system orders

I/O Address= 503CH

bit 7							bit 0
ABSHDECT	NMASTER	NA/B	ADR12	ADR11	ADR10	ADR9	ADR8

NADR12 .. NADR8 = State of the entries fixing the CLX position number.

NA/B=0 : LDS card equipped with 16 interfaces

NA/B=1 : LDS card equipped with 8 interfaces

NMASTER=0 : master LDS

NMASTER=1 : slave LDS

ABSHDECT=0 : LDS card receives a DECT clock in entry (for the card configured in slave mode)

ABSHDECT=1 : LDS card does not receives a DECT clock in entry (for the card configured in slave mode). For the card configured in master mode, ABSHDECT=1 by default.

Note : *Bit 7 is accessible only starting from technical index HJ4094AR (16 interfaces) or HJ4094BR (8 interfaces) of LDS card.*

Chapter 6 - Implementation of hardware on NeXspan 500

6.1 Interface card

LDT cards, possibly fitted with one or two ADPCM32B daughter cards are used to connect DECT base stations to a NeXspan 500.

LDT cards have T0/S0 interfaces for managing 2- or 4-channel DECT base stations. There are two versions of each card:

- LDTA: 8 T0/S0 interfaces
- LDTB: 16 T0/S0 interfaces

LDTA cards allow sixteen 2-channel DECT base stations to be connected, and LDTB cards eight 2-channel DECT base stations. 4-channel base stations can be connected by adding one or two daughter cards ADPCM32B. An ADPCM32B card can manage eight 4-channel base stations.

6.2 Configuring the LDT card

6.2.1 References and equipment

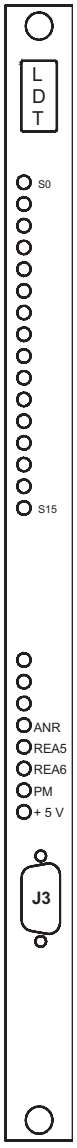
Designation		Reference
LDTA	16 T0/S0 interfaces for 2- or 4-channel DECT base stations	HJ4758A
LDTB	8 T0/S0 interfaces for 2- or 4-channel DECT base stations	HJ4758B
ADPCM32B	Daughter card for managing 8 x 4-channel DECT base stations	HJ4402B
AVADQ	Synchronous bus link plug (loop DECT clock recovery is not possible with this plug)	HR5124B
LDTA cable	LDTA-distribution frame link cable (1)	HG4302A
LDTB cable	LDTB-distribution frame link cable (1)	HG4302B
LDTA cable	LDTA-distribution frame link cable (2)	AHG0013A
LDTB cable	LDTB-distribution frame link cable (2)	AHG0013B

Table 1: References and equipment

Note: *(1) This cable allows to transmit DECT clock 800 ms by the distribution frame.*

Note: (2 *New LDT cable to use when the synchronization signal is sent via the loop and transmitted to the LDT cards via the back plane*

6.2.2 Front panel

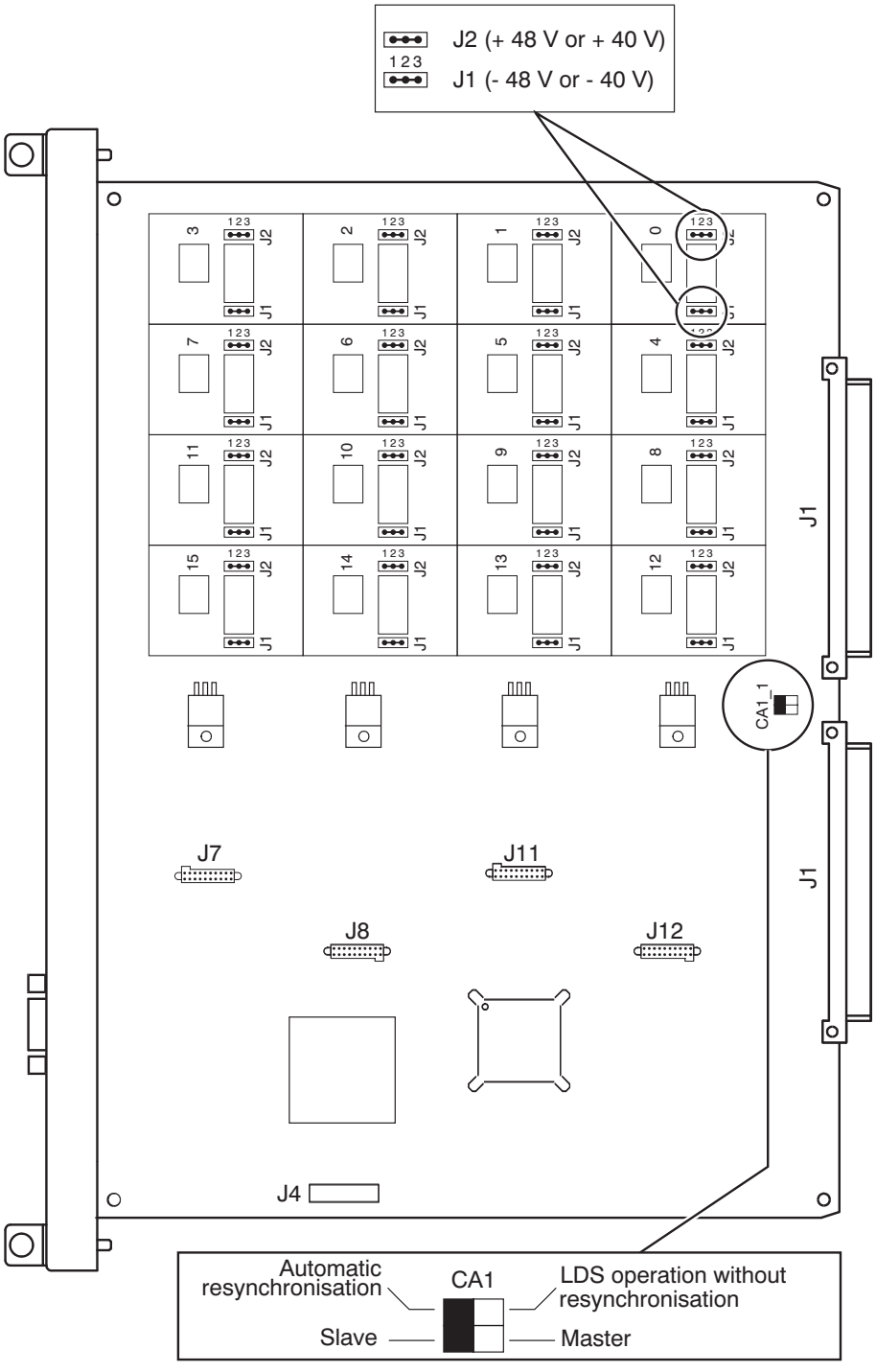


S0 to S15 Interface Activation Display (level 1)

ANR	Address not recognised (Fault)		
REA5	Rapid LED flashing	-->	Card operational
	Slow LED flashing	-->	Card operational
REA6	Not significant (LED off)		
PM	LED steady on	-->	Card operational
	LED off	-->	Card not operational
+ 5 V	Presence of + 5 V powering the card		

Figure 6-1: Front panel of LDT card

6.2.3 Equipment on top side



The black square represents the position of the switch.

J7, J8: ADPCM32B daughter card equipment

J11, J12: equipment of second ADPCM32B daughter card

Figure 6-2: Top view of the LDT card

6.2.4 Switch settings

Automatic resynchronization switch

CA1.2 = ON -> Automatic resynchronization

CA1.2 = OFF -> LDS operation without automatic resynchronization

Remote power supply configuration straps

- J1 set to 1-2 = Remote power supply ON
- J2 set to 1-2 = Remote power supply ON
- J1 set to 2-3 = Remote power supply OFF
- J2 set to 2-3 = Remote power supply OFF

J1: - 48 V or - 40 V

J2: +48 V or +40 V

The two jumpers must be positioned on the same side: 1-2 or 2-3.

DECT configuration switches

- CA1.1 = ON -> Slave mode
- CA1.1 = OFF -> Master mode
-

6.2.5 INSTALLING THE LDT CARD

Proceed as follows to install an LDT card:

- "Insert the LDT card in a CLX slot with synchronous bus access.
- "Connect it to the synchronous bus with a plug.
- "Connect it to a synchronizing clock input in the PBX in the case of a synchronizing T0 interface on the LDT card.
- "Connect the remote power supply if S0 terminals or DECT base stations are used on the LDT card.
- "Connect the DECT synchronization (800 ms time signal) if retrieved by DECT base stations from the S interface (M bit); the synchronization can be made in master or slave mode.

6.2.6 LDT card layout

The LDT card can be fitted in the shelves in accordance with the configuration file. The card is linked to the synchronous bus via the AVADQ plug connected in the front CFX position 23 (corresponding to the CLX position 7 on the LDT card).

For more detailed information, refer to document [12] in the reference documents.

The LDT card must be connected to a synchronising clock input in the PBX if a T0 interface is synchronising on the LDT card.

Each group of 8 S interfaces must be connected to a complete junction (32 TS) on the synchronous bus of the NeXspan 50. The LDTA card thus requires two junctions.

	CLX0	CLX1	CLX2	CLX7
Terminator				HR5124B
Trunks	J8 + J12	J9 + J13	J10 + J14	J11 + J15
Capacity	8 S (J8) 16S (J8, J12)	8 S (J9) 16 S (J9, J13)	8 S (J10) 16 S (J10, J14)	8 S (J24) 16 S (J11, J15)

TOPRAD jumpers allows to recover the DECT synchronization signal sent to the LDT cards via the backplane through the loop.

6.2.7 ISDN CLOCK INTERFACE

If a T0 interface is synchronizing on the LDT card, the RSU is connected with a cable HG4302A/B or AHG0013A/B (21-pin J3 connector).

The synchronizing T0 can be allocated with any channel of the LDT card. The synchronizing card (no more than one for simplex and duplex configurations) must be installed in the main rack of the PBX because of the length of the clock cable. The maximums may be 2 or 4 if there is no network or intersite T2.

6.2.8 DECT CLOCK INTERFACES

The CSI card generates a DECT clock and sends this clock to all the PBX clusters. The synchronization signal is sent via the loop and extracted by the RMH cards. The DECT synchronization signal is then sent to the LDT cards via the backplane. The configuration rules are as follows:

- The DECT base stations must be configured in synchronization mode by the M bit.
- The LDT cards must all be configured in "Slave" mode.
- For co-located clusters: there is no transmission delay on the loop. The adjustment is exactly the same on all the RMH cards (Value V=1). Therefore, the switches must be configured as follows (factory setting):

"CA3-3 and CA3-4 = OFF

"CA2 + CA1 + CA3-1,2 = ON

Note :Binary value: ON = 0; OFF = 1

- For remote clusters: the transmission time compensation on the loop must be configured in the RMH card(s) of all the clusters that contain LDT cards to which DECT base stations are connected. This configuration is set through the switches on the RMH card.

The signal 800ms will be transmitted to LDT card according to the position of jumper TOPRAD for each position of LDT

Name	Position	Using			
TOPRAD	J13	DECT CLX7 clock	present	=>	jumper set to ON *
TOPRAD	J16	DECT CLX2 clock	present	=>	jumper set to ON *
TOPRAD	J19	DECT CLX1 clock	present	=>	jumper set to ON *
TOPRAD	J22	DECT CLX0 clock	present	=>	jumper set to ON *

Figure 6-3: FPS backplane jumpers

* Make sure you respect the screen printing; there is no foolproofing

6.2.9 Connecting the LDT board

The LDT card is inserted in a CLX slot in the base and/or expansion shelves depending on the configuration file.

The LDT card is connected to the distributor by a special cable also used for the remote power supply connection.

The remote power supply connection requires a cable (the specific cable) used to retrieve the subscriber's 40 V ISDN or the 48 V on the backplane.

The ISDN clock is connected to the RSU with a 21-pin connector.

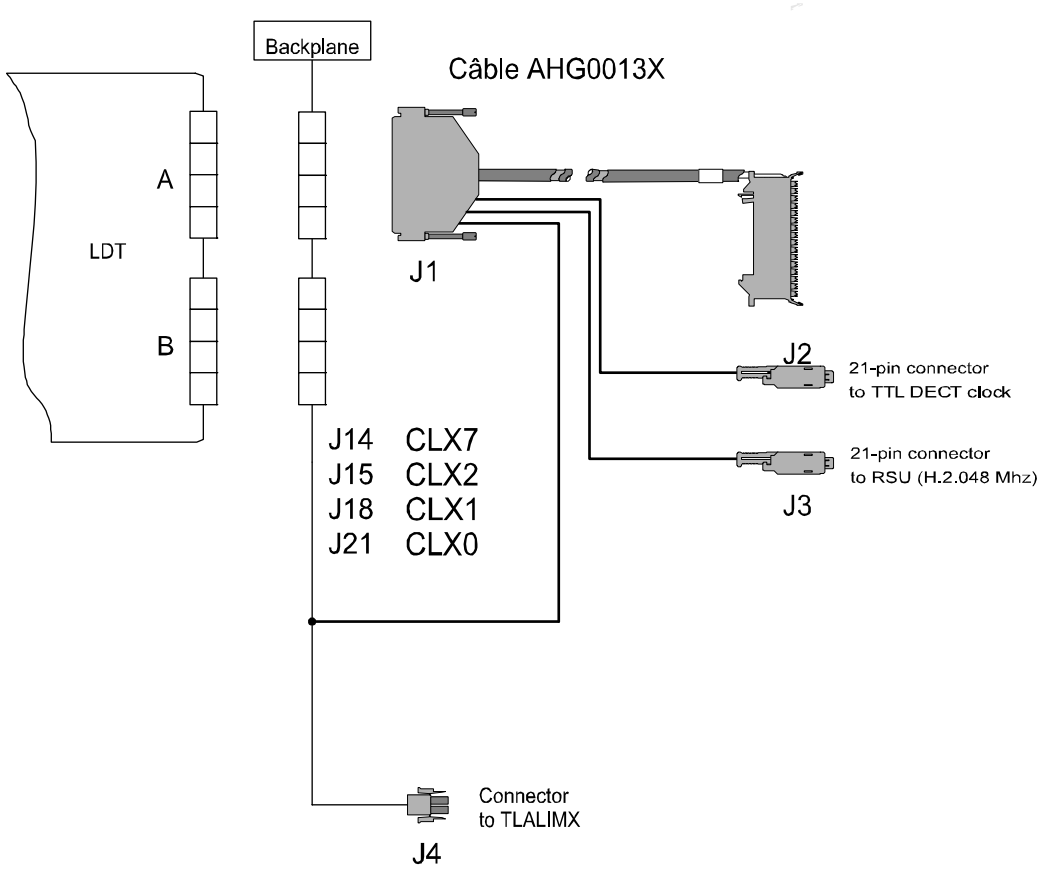


Figure 6-4: AHG0013X cable

Note: *New LDT cable must be used if DECT clock (800 ms) forwards by the loop: case of a PBX equipped with FPS backplane, a CSI card and FPG backplane*

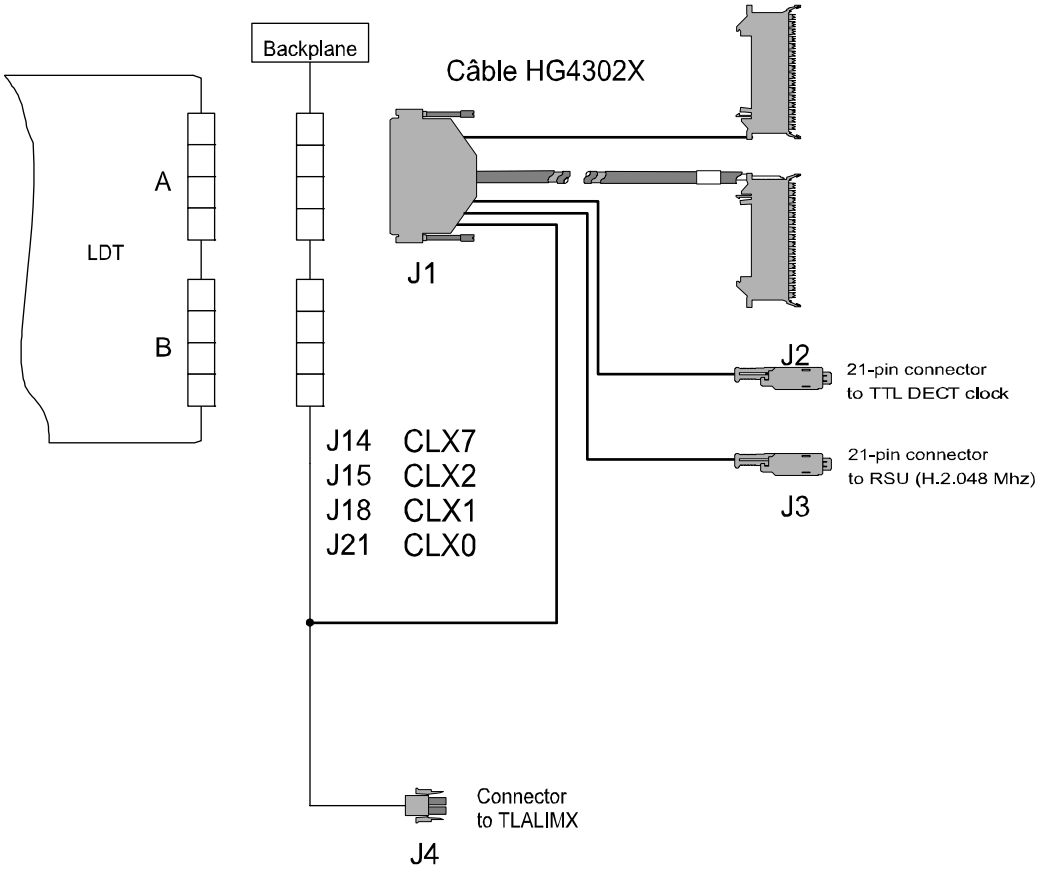


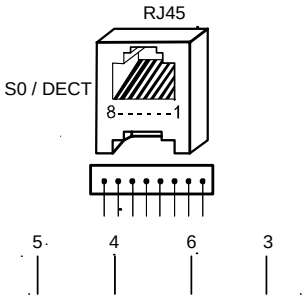
Figure 6-5: HG4302X cable

Note: *This cable allows to transmit DECT clock 800 ms by the distribution frame*

6.2.10 Distribution frame wiring with cable AHG0013A

On the distribution frame end the cable has:

- 4 yellow terminal strips (16 transmission/reception interfaces),



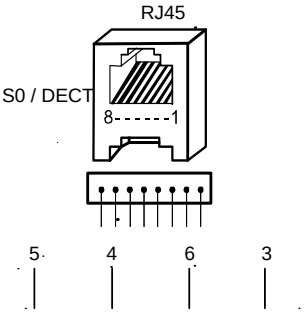
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) CLEAR	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) CLEAR	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) CLEAR	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) CLEAR	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) CLEAR	NRD4 (C10) YELLOW	ED5 (B10) GRAY	NED5 (B11) BROWN	RD5 (C11) INCOL	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) CLEAR	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) VIOLET	NRD7 (C14) BLUE
2G	ED8 (B14) ORANGE	NED8 (B15) JAUNE	RD8 (B12) VIOLET	NRD8 (B13) BROWN	ED9 (B16) ORANGE	NED9 (A16) BLACK	RD9 (C15) VIOLET	NRD9 (C16) RED	ED10 (A17) ORANGE	NED10 (A18) GREEN	RD10 (C17) VIOLET	NRD10 (C19) WHITE	ED11 (A19) ORANGE	NED11 (B22) BLUE	RD11 (B20) VIOLET	NRD11 (B23) YELLOW
3G	ED12 (B24) ORANGE	NED12 (B25) MARRON	RD12 (C23) VIOLET	NRD12 (C25) BLACK	ED13 (B26) ORANGE	NED13 (B27) RED	RD13 (C26) VIOLET	NRD13 (C27) GREEN	ED14 (A25) GRAY	NED14 (A26) WHITE	RD14 (A27) CLEAR	NRD14 (A28) BLUE	ED15 (B28) GRAY	NED15 (B29) YELLOW	RD15 (C28) CLEAR	NRD15 (C29) BROWN

Figure 6-6: Distribution frame wiring with cable AHG0013A

6.2.11 Distribution frame wiring with cable AHG0013B

On the distribution frame end the cable has:

- 4 yellow terminal strips (16 transmission/reception interfaces),



	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) CLEAR	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) CLEAR	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) CLEAR	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) CLEAR	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) CLEAR	NRD4 (C10) YELLOW	ED5 (B10) GRAT	NED5 (B11) BROWN	RD5 (C11) CLEAR	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) CLEAR	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) VIOLET	NRD7 (C14) BLUE

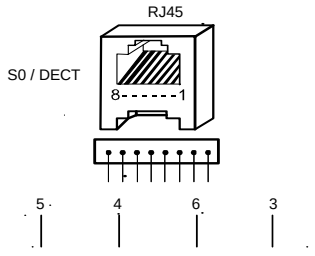
Figure 6-7: Distribution frame wiring with cable AHG0013B

6.2.12 Distribution frame wiring with cable HG4302A

On the distribution frame end the cable has:

- 4 yellow terminal strips (16 transmission/reception interfaces),
- 1 red terminal strip (DECT synchronization).

Note: *This cable allows to transmit DECT clock 800 ms by the distribution frame*



	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) CLEAR	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) CLEAR	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) CLEAR	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) CLEAR	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) CLEAR	NRD4 (C10) YELLOW	ED5 (B10) GRAY	NED5 (B11) BROWN	RD5 (C11) INCOL	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) CLEAR	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) VIOLET	NRD7 (C14) BLUE
2G	ED8 (B14) ORANGE	NED8 (B15) JAUNE	RD8 (B12) VIOLET	NRD8 (B13) BROWN	ED9 (B16) ORANGE	NED9 (A16) BLACK	RD9 (C15) VIOLET	NRD9 (C16) RED	ED10 (A17) ORANGE	NED10 (A18) GREEN	RD10 (C17) VIOLET	NRD10 (C19) WHITE	ED11 (A19) ORANGE	NED11 (B22) BLUE	RD11 (B20) VIOLET	NRD11 (B23) YELLOW
3G	ED12 (B24) ORANGE	NED12 (B25) MARRON	RD12 (C23) VIOLET	NRD12 (C25) BLACK	ED13 (B26) ORANGE	NED13 (B27) RED	RD13 (C26) VIOLET	NRD13 (C27) GREEN	ED14 (A25) GRAY	NED14 (A26) WHITE	RD14 (A27) CLEAR	NRD14 (A28) BLUE	ED15 (B28) GRAY	NED15 (B29) YELLOW	RD15 (C28) CLEAR	NRD15 (C29) BROWN
4G	SYNP (A03) RED	SYNN (A02) BLUE	SYNAP (C09) RED	SYNAN (C04) BLUE	SYNBP (C03) RED	SYNBN (C02) BLUE										ECRAN (B01)

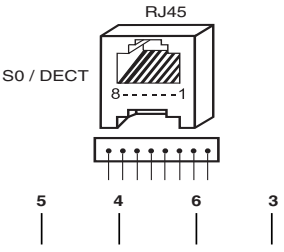
Figure 6-8: Distribution frame wiring with cable HG4302A

6.2.13 Distribution frame wiring with cable HG4302B

On the distribution frame end the cable has:

- 2 yellow terminal strips (8 transmission/reception interfaces),
- 1 red terminal strip (DECT synchronization).

Note: *This cable allows to transmit DECT clock 800 ms by the distribution frame.*



	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
0G	ED0 (A02) GRAY	NED0 (A03) WHITE	RD0 (C02) TRANSPARENT	NRD0 (C03) BLUE	ED1 (B03) GRAY	NED1 (B04) YELLOW	RD1 (C04) TRANSPARENT	NRD1 (A04) BROWN	ED2 (B05) GRAY	NED2 (B06) BLACK	RD2 (C05) TRANSPARENT	NRD2 (C06) RED	ED3 (A06) GRAY	NED3 (A07) GREEN	RD3 (C07) TRANSPARENT	NRD3 (C08) WHITE
1G	ED4 (B08) GRAY	NED4 (B09) BLUE	RD4 (C09) TRANSPARENT	NRD4 (C10) YELLOW	ED5 (B10) GRAY	NED5 (B11) BROWN	RD5 (C11) TRANSPARENT	NRD5 (C12) BLACK	ED6 (A09) GRAY	NED6 (A10) RED	RD6 (A11) TRANSPARENT	NRD6 (A12) GREEN	ED7 (A13) ORANGE	NED7 (A14) WHITE	RD7 (C13) PURPLE	NRD7 (C14) BLUE
4G	SYNP RED	SYNN BLUE	SYNAP RED	SYNAN BLUE	SYNBP RED	SYNBN BLUE										SHIELD

Figure 6-9: Distribution frame wiring with cable HG4302B

6.2.14synchronization

The set of FPS backplane allows the DECT clock to be sent on the loop and simplifies the DECT synchronization wiring in a single-site configuration

The CSI board generates a DECT clock and sends this clock to all the PBX clusters. The synchronization signal is sent via the loop and extracted by the RMH boards. The DECT synchronization signal is then sent to the LDT boards via the back plane.

Hardware specifications

- The PBX is equipped with a CSI card.
- Only the LDT cards are used to connect base stations.
- All clusters are equipped with RMH cards, ref.: HJ3773BD03 (minimum index for transmitting the DECT clock on the loop) for sending the DECT clock.
- The plugs used with the LDT cards are AVADQ plugs (ref HR5124B),
- Jumpers TOPRAD correctly set on the FPS backplane

Configuration

- The DECT base stations must be configured in synchronization mode by the M bit.
- All the LDT cards must be configured as "Slaves" ("Master"/"Slave" mode can be configured via jumper CA1.1).
- For co-located clusters: there is no transmission delay on the loop. The setting is the same on all the RMH cards, V=1. Therefore, the switches must be configured as follows (factory configuration):
  CA3-3 and CA3-4 = OFF
  CA2 + CA1+ CA3-1,2 = ON
  Binary value: ON = 0 ; OFF = 1

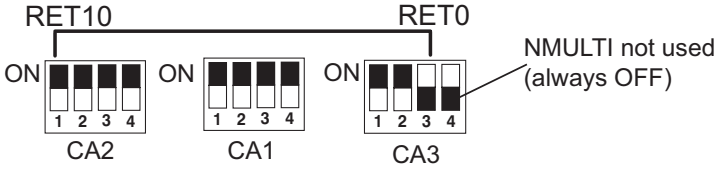


Figure 6-10: Default configuration (factory configuration) of switches CA1, CA2, CA3 on the RMH card (V= 1)

- For remote clusters: the transmission time compensation on the loop must be configured in the RMH board(s) of all the clusters that contain LDT boards to which DECT base stations are connected. This configuration is performed using 11 switches (binary value : ON = 0; OFF = 1)
  - for a coaxial loop (each switch = step of 12 meters) :

Distance (in meters)	RET11	RET10	RET9	RET8	RET7	RET6	RET5	RET4	RET3	RET2	RET1	RET0
0 à 12	on	on	on	on	on	on	on	on	on	on	on	on
12 à 24	on	on	on	on	on	on	on	on	on	on	on	**OFF**
24 à 36	on	on	on	on	on	on	on	on	on	on	**OFF**	on
36 à 48	on	on	on	on	on	on	on	on	on	on	**OFF**	**OFF**
.....												
192 à 204	on	on	on	on	on	on	on	**OFF**	on	on	on	on
204 à 216	on	on	on	on	on	on	on	**OFF**	on	on	on	**OFF**
216 à 228	on	on	on	on	on	on	on	**OFF**	on	on	**OFF**	on
228 à 240	on	on	on	on	on	on	on	**OFF**	on	on	**OFF**	**OFF**
.....												

  - For a fibre-optic loop, the value to be configured is given with the formula:

$$V = \frac{L \times 5,5 + (N+1) \times 40}{61}$$

L = total length (in meters) of cable or fiber sections from the USB.
N = number of clusters between the USB and the cluster for which the calculation is made.

- For the DECT clock to be transmitted correctly on the loop, switches CA1, CA3 and CA4 on the CSI card must be configured as follows (factory configuration):
  Default configuration (factory configuration) of switches CA1, CA3, and CA4 on the CSI card

CA1 + CA3 + CA4 = ON
Binary value : ON = 0 ; OFF = 1

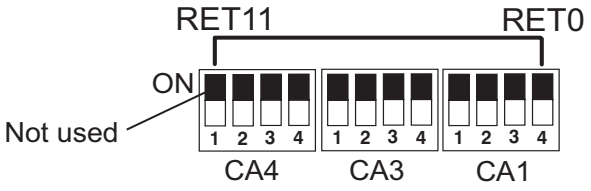


Figure 6-11 : Default configuration (factory configuration) of switches CA1, CA3, CA4 on the CSI card

6.3 LDT/LDS card diagnosis means on NeXspan 500

The method used to check that the LDT/LDS card configuration and the DECT synchronization clocks wiring are correct, rests on the contents reading of some accesssibles registers on these cards.

The accessible registers are not the same ones for LDT and LDS card.

The command vport must be used under "enter command" prompt with following syntax

VPORT ADR=aaaa GP=xx CLX=y

with: aaaa=register I/O address
xx=cluster number
y=LDT/LDS card number

6.3.15 Register content reading of LDT card

REGISTER CFG

I/O Address= 5010H

Bit 7							Bit 0
0	SPH	ABSHDECT	POLHRAD	NF1	0	0	NF0

NF0=1 : new daughter card of signal treatment presents (channel 0-7)

NF1=1 : new daughter card of signal treatment presents (channel 8-15)

SPH=1 : advance or delay superiors at 16 periods of the bit clock .

POLHRAD=1 : bad DECT clock polarity

ABSHDECT=1 : DECT clock not available in entry of LDT card.

Note: *the bits SPH , POLHRAD et ABSHDECT are reset by register reading.*

REGISTER RNBRESYNC

I/O Address= 5032H

Register NBRESYNC gives the number of times that LDT card switches to resynchronization mode. Its maximum value (FFH) is preserved once reached as long as this register is not read again.

Note: *This register is incremented only if LDT card is in automatic resynchonisation mode. The reading of this one gives to zero the meter*

REGISTER RFEN

Register RFEN, accessible in reading only, contains the localization code of the card. Its content is the code cabled in back plane, that is to say the reverse of the CLX number used for the recognition of the bus system orders.

I/O Address= 503CH

bit 7							bit 0
RESYNC AUTO	MASTER	NA/B	0	NADR11	NADR10	NADR9	NADR8

NADR11 .. NADR8 = Etat des entrées fixant le numéro de la position CLX .

NA/B=0 : LDT card equipped with 16 interfaces
NA/B=1 : LDT card equipped with 8 interfaces

MASTER=1 : LDT provides DECT clock (master)

RESYNCAUTO=1 : LDT is in automatic resynchonisation mode

6.3.16 Content reading of LDS card registers

REGISTER RFEN

Register RFEN, accessible in reading only, contains the localization code of the card. Its content is the code cabled in back plane, that is to say the reverse of the CLX number used for the recognition of the bus system orders

I/O Address= 503CH

bit 7							bit 0
ABSHDECT	NMASTER	NA/B	ADR12	ADR11	ADR10	ADR9	ADR8

NADR12 .. NADR8 = State of the entries fixing the CLX position number.

NA/B=0 : LDS card equipped with 16 interfaces

NA/B=1 : LDS card equipped with 8 interfaces

NMASTER=0 : master LDS

NMASTER=1 : slave LDS

ABSHDECT=0 : LDS card receives a DECT clock in entry (for the card configured in slave mode)

ABSHDECT=1 : LDS card does not receives a DECT clock in entry (for the card configured in slave mode). For the card configured in master mode, ABSHDECT=1 by default.

Note: *Bit 7 is accessible only starting from technical index HJ4094AR (16 interfaces) or HJ4094BR (8 interfaces) of LDS card.*

Chapter 7 - Multi-site synchronization

7.1 Principles of installation

7.1.1 Contiguous multi-site configuration

In a contiguous multi-site configuration, the base stations of site 1 can "hand over" to base stations of site 2. The base stations of the different sites must therefore be synchronized with a single 800 ms clock.

If the configuration allows it, it is preferable to synchronize the remote site(s) via the inter-site link(s) and NOT via the external accesses (France Telecom) to obtain 2.048 MHz bit synchronization.

F4 multi-site configurations with a link (T2 or QSIG)

- For a device equipped with an FPHBG back plane and CSH, LDS and/or LDT cards: with two inter-site links, when the USB is duplicated, the clock of the first link synchronizes the first card of the USB (CSH, CUH or CUS card) of the slave PBX, and the clock of the second inter-site link synchronizes the second card of the USB of the slave PBX.
  If the USB is not duplicated (single CSH, CSI, CUH or CUS card), the clock of the second inter-site link must be connected to the same CSH, CSI, CUH or CUS card as the clock of the first link.
- For a device equipped with an FPHBG2 back plane and CSI, LDT card: the BCSI board, connected to the RHMIC board, synchronizes the USB boards in NeXspan 50s to provide a DECT synchronous multisite network offering DECT mobiles the inter-site handover function. The BCSI board sends or receives the DECT synchronization and the 2.048 MHz bit synchronization to/from another PBX; it determines the compensation to make on the DECT clock received according to the distance of the transmitting PBX and retransmits the clocks received to the CSI card.

7.1.2 Non-contiguous multi-site configuration

In a non-contiguous multi-site configuration there is no overlap between the radio coverage of the different sites. It is not therefore necessary to synchronize the base stations of the different sites, nor the sites themselves.

Note: *Before setting up a DECT multi-site network, particularly if the network uses multiplexers or modems in the inter-site links, contact the manufacturer's pre-sale services.*

7.2 Distributing DECT synchronization to the base stations

7.2.1 Distribution by M bit

Here the synchronization signal is distributed to the base stations by the M bit of the S0 frame from the DECT interface card (LD4/LD4N cards for the M6501 L/R/RM IP PBX (F1), LD4/LD4NX cards (LD4N or LD4X mode) for the NeXspan S/L/D (F6), LDS card for the M6540 IP PBX (F2) , LDT card for NeXspan 50 (F4) equipped with FPHBG2/CSI and the LDT card for NeXspan 500 (F4) equipped with FPS/CSI.

In an F2 or F4 (equipped with FPHBG or FPS, CSH or CSI, LDS and/or LDT), a master LDS card (or LDT card in an F4) synchronizes the slave LDS card (and/or LDT card in an F4) through wiring on the distribution frame. In this mode, multisite handover in an F2 and/or F4 network is possible provided that bit synchronization (2.048 Mhz clock) is carried out (by inter-site link).

7.2.2 Distribution by 3rd pair

The base stations of the different sites must be synchronized by wiring a third pair in the following circumstances:

- if the installation has several PBXs not equipped with DECT synchronization ports
- configuration using integrated S0 accesses of the first generation NeXspan S CPU card (UCT1-S).

In this case, the synchronization signal is distributed by a 3rd pair from a master base station to the slave base stations. Between one and four slave base stations may be connected to the master base station. If there are more than 5 base stations, a repeater is required to distribute the clock synchronization generated by the master base station.

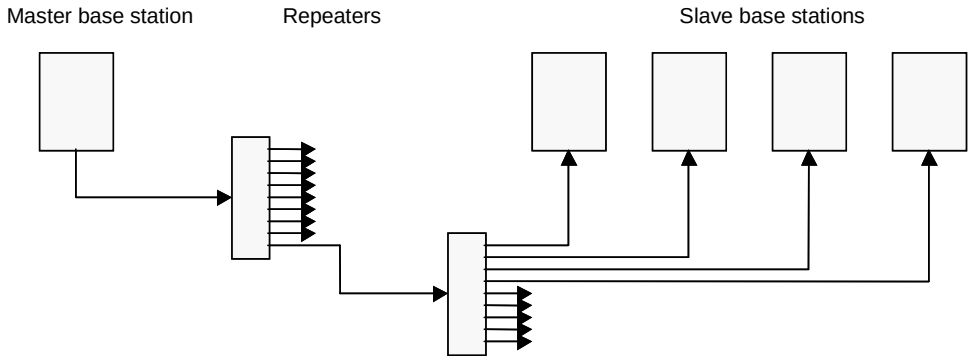


Figure 7-1: Distribution by 3rd pair

Wiring synchronization with the REP16 repeater

Description of the REP 16 repeater

It is possible to connect:

- only one base station per repeater output (two base stations on outputs 7 and 14)
- one to four repeaters to the master base station.

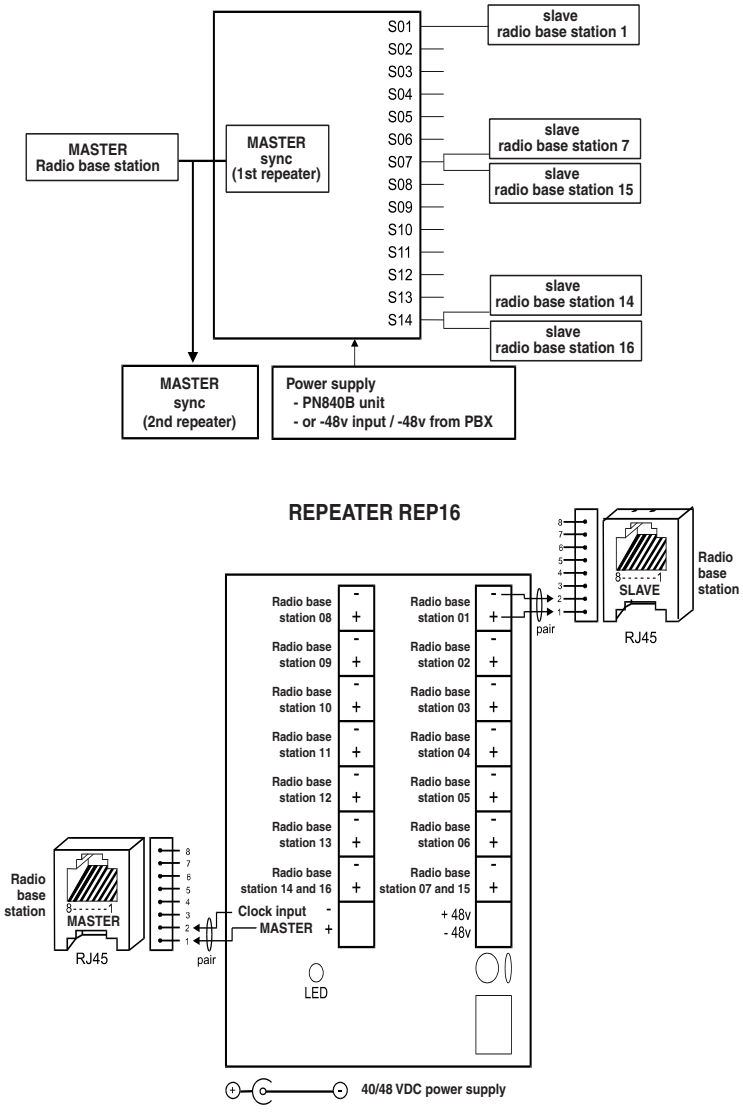


Figure 7-2: Wiring synchronization with the REP16 repeater

Wiring REP96 repeater synchronization

Description of REP 96

Up to four base stations may be connected per repeater output and from one to four repeaters may be connected to the master base station.

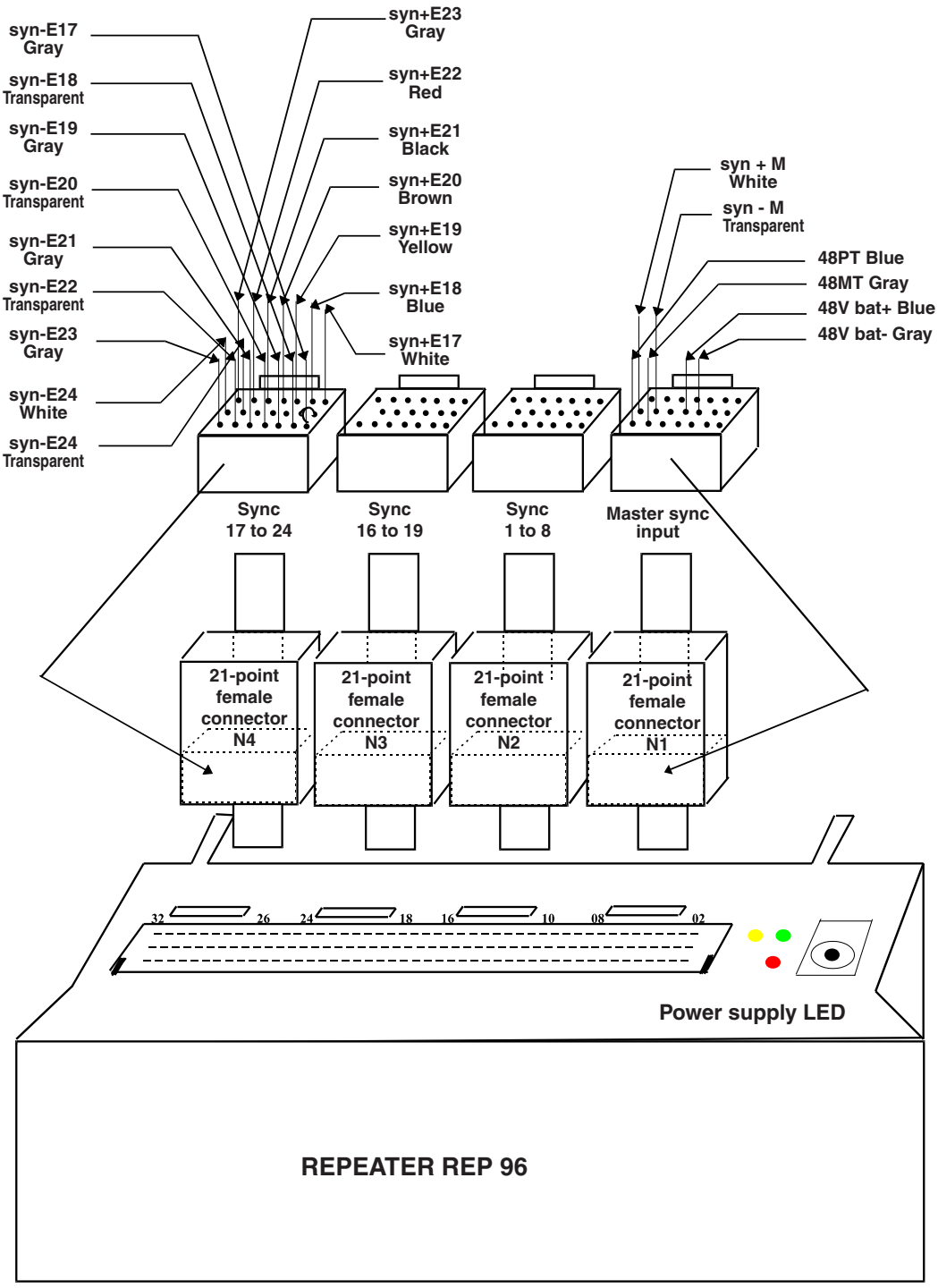


Figure 7-3: Wiring REP96 repeater synchronization

32	SYN-E23	SYN+E24	SYN+E23	
31	SYN-E22	SYN-E24	SYN+E22	
30	SYN-E21		SYN+E21	21-pin connector range
29	SYN-E20		SYN+E20	
28	SYN-E19		SYN+E19	
27	SYN-E18	EN-G3	SYN+E18	
26	SYN-E17	GND	SYN+E17	
25				
24	SYN-E15	SYN+16	SYN+E15	
23	SYN-E14	SYN-16	SYN+E14	
22	SYN-E13		SYN+E13	21-pin connector range
21	SYN-E12		SYN+E12	
20	SYN-E11		SYN+E11	
19	SYN-E10	EN-G2	SYN+E10	
18	SYN-E9	GND	SYN+E9	
17				
16	SYN-E7	SYN+8	SYN+E7	
15	SYN-E6	SYN-8	SYN+E6	
14	SYN-E5		SYN+E5	21-pin connector range
13	SYN-E4		SYN+E4	
12	SYN-E3		SYN+E3	
11	SYN-E2	EN-G1	SYN+E2	
10	SYN-E1	GND	SYN+E1	
9				
8	48 PT	SYN+M		
7	48 MT	SYN-M		
6				21-pin connector range
5		48 V Bat +		
4		48 V Bat -		
3				
2				
1				

Figure 7-4: 96-pin repeater connector (top view)

7.3 Synchronization on M6501 L/R/RM IP PBX and Succession 6500 Media Gateway with OCT4/OCT4 I

7.3.1 Principles of installation

In a network containing several PBXs fitted with an OCT4 or OCT4 I card (M6501 L/R/RM IP PBX and Succession 6500 Media Gateway), it is not necessary to wire the DECT base stations with a third pair for synchronization. The OCT4/OCT4 I cards are connected by an ISDN cable via a synchronization port. This cable carries the multi-frame and bit clocks.

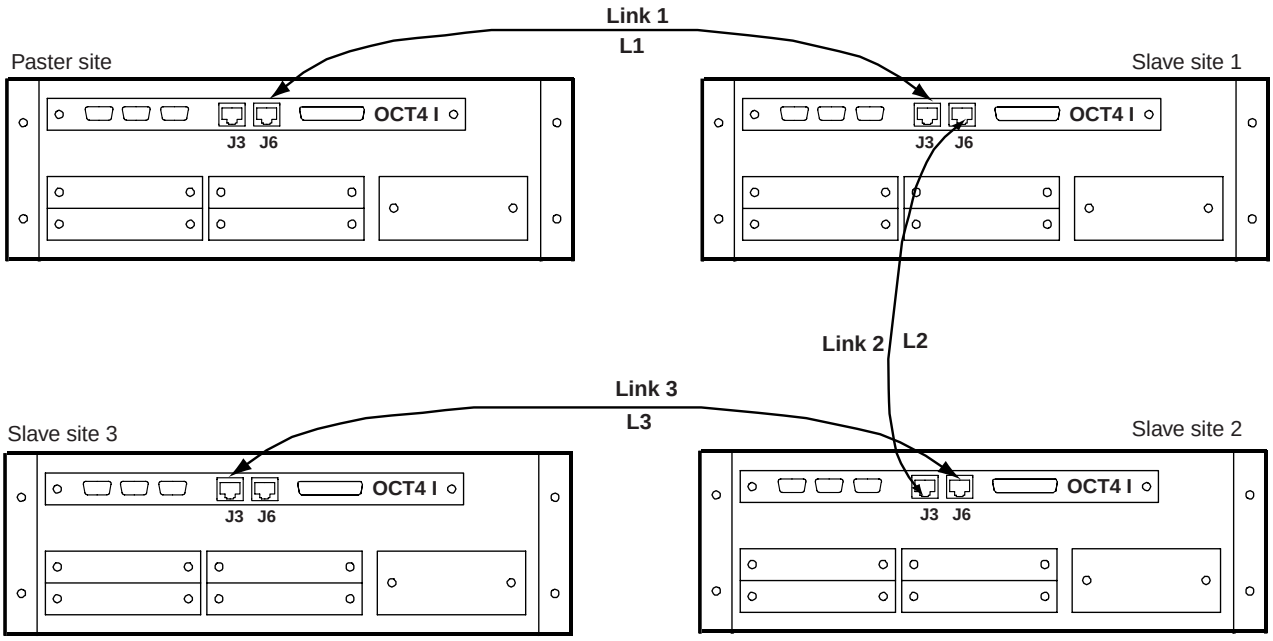


Figure 7-5: Multi-site synchronization with OCT4/OCT4I

Each OCT4/OCT4 I card has two synchronization ports (RJ45 connectors): a secondary port, J6 (output) and a primary port, J3 (input).

The secondary port of the master or N slave is connected to the primary port of the first slave or slave N+1.

The DECT clocks are transmitted from one PBX to another with a timeout depending on:

- the length of the connection cable
- the timeout set for the transmitters/receivers of each PBX.

This timeout can be adjusted via MMC (see chapter - Multi-site programming, § 11.4). Adjustment is made in 100 m steps on the slave PBXs, with the following formula applied:

8xN + totalL
where N = number of slave PBXs from master PBX
and totalL = total length of cable between master and slave PBX

Example figure above:

- L1 = 50m, L2 = 200m, L3 = 27 m
  - Compensation for slave site 1:
    8x1 + 50 = 58 m => compensation < 100m
  - Compensation for slave site 2:
    8x2 + 50 + 200 = 266 m => compensation < 300m
  - Compensation for slave site 3:
    8x3 + 50 + 200 + 27 = 301 m => compensation < 400m

Note: *The maximum cumulative length of the cable must not exceed 1952 m.*
The cumulative length of the cable between a slave N and slave N+2 must not exceed 600 m.

7.3.2 Wiring of synchronization ports

ISDN straight wiring:

	Signal	RJ45 J6	RJ45 J3
1st pair 2.048 MHz clock	PHBIT	3	3
	NHBIT	6	6
2nd pair DECT clock	PHDECT	4	4
	NHDECT	5	5

Tableau 6 : Wiring of synchronization ports

7.4 synchronization on NeXspan S/L/D with UCT-S/UCT-L/UCT-D

Note: *NeXspan S12 and NeXspan C have no synchronisation port but are capable of multi-site DECT synchronisation via a third pair.*

7.4.1 Principles of installation

In a network containing several PBXs fitted with a UCT-S or UCT-L or UCT-D card (NeXspan-S or NeXspan-L or NeXspan-D), it is not necessary to wire the DECT base stations with a third pair for synchronization (unless the integrated S0 accesses of the first generation NeXspan S CPU card (UCT1-S) are used). The UCT-S/UCT-L/UCT-D cards are connected by an ISDN cable via a synchronization port. This cable carries the multi-frame and bit clocks.

In a multi-site network with several NeXspan cabinets (XS or XL or XD), synchronization is carried out from one or two PBXs declared "Master".

- Simplex mode: one PBX is configured in "Master" mode and supplies the entire multi-site network with the DECT synchronization signal. In this case, the primary port is used. The secondary port of the master is connected to the primary port of the first slave. The secondary port of each slave is connected to the primary port of the next slave (cascade wiring).
- Duplex mode: two PBXs are configured in "Master" mode and are capable of supplying the entire multi-site network with the DECT synchronization signal. One of the two PBXs must be configured (via MMC) in "Priority" mode and the other in "Not priority" mode. The PBX configured in "Priority" mode supplies the DECT synchronization signal. If a problem is detected on the "Priority Master" PBX (alarm detected in the clock system or PBX not synchronized on the PSTN), the "Not priority Master" PBX takes over dynamically and supplies the entire multi-site network with the DECT synchronization signal (the distance between the two “Master” PBXs should not be more than 10 meters) .

Each UCT-L/UCT-S card has two RJ45 DECT synchronization connectors: a primary port J7A (on input) and a secondary port J7B (on output).

IUCT-D card on NeXspan D has two RJ45 DECT synchronization connectors: a primary port J8A (on input) and a secondary port J8B (on output).

The DECT clocks are transmitted from one PBX to another with a timeout depending on:

- the length of the connection cable
- the timeout set for the transmitters/receivers of each PBX.

This timeout can be adjusted via MMC (see chapter - Multi-site programming, § 11.5). Adjustment is made in 100 m steps on the slave PBXs, with the following formula applied:

8xN + totalL
where N = number of slave PBXs from master PBX
and totalL = total length of cable between master and slave PBX

Indicators

There are several LEDs on the front panel of UCT cards providing information about synchronization clock operation and DECT multi-site synchronization:

Note: *The "S.DECT" and "MST DECT" LEDs are absent from the UCTS-12 and UCT-C front panel.*

Note: *On the NeXspan D, the "S.DECT" and "MST DECT" LEDs are presents from the IUCT-D card front panel.*

LED	STATE	EXPLANATION
S.EXT (green/red)	ON green OFF	Network synchronization clock correct synchronization clock fault alarm
S.DECT (green/red)	ON green ON red Flashes green Flashes red	DECT synchronization correct DECT synchronization loss alarm synchronization search Polarity inversion in the wiring of the DECT synchro signal
MST DECT (green)	ON	synchronization master PBX

Tableau 7 : Meaning of UCT/IUCT-D card synchronization LEDs

- Operation in Simplex mode

1. Normal operation: the master is synchronized on the network (S.EXT, S.DECT and MST.DECT LEDs lit). The slaves receive the DECT synchronization signal from the master (S.DECT LED lit green).
2. Break in the cable between the master and the first slave: the slave detects a malfunction (S.DECT LED lit red); after a few moments the slave becomes master and generates its own synchronization to the other slaves (S.DECT and MST DECT LEDs lit).

- Operation in Duplex mode

1. Normal operation: it is assumed that the two masters, "priority" and "not priority", are connected to the PSTN network. The priority master supplies the entire multi-site network with the synchronization single (S.EXT, S.DECT and MST.DECT LEDs lit). The "not priority" master and the slaves reeceive the DECT synchronization signal from the priority master (S.DECT and S.EXT LEDs lit on the not priority master, and S.DECT LED lit green on the slaves).
2. The link between the "priority" master and the PSTN is broken (S.EXT LED out). This information is sent (see wiring in section 7.4.3) to the "not priority" master. The "not priority" master takes over, becomes master and supplies the synchronization signal (S.EXT, S.DECT and MST.DECT LEDs lit) to the entire network (S.DECT LED lit green on "priority" master and slaves).

7.4.2 Wiring examples

Series wiring in Simplex mode

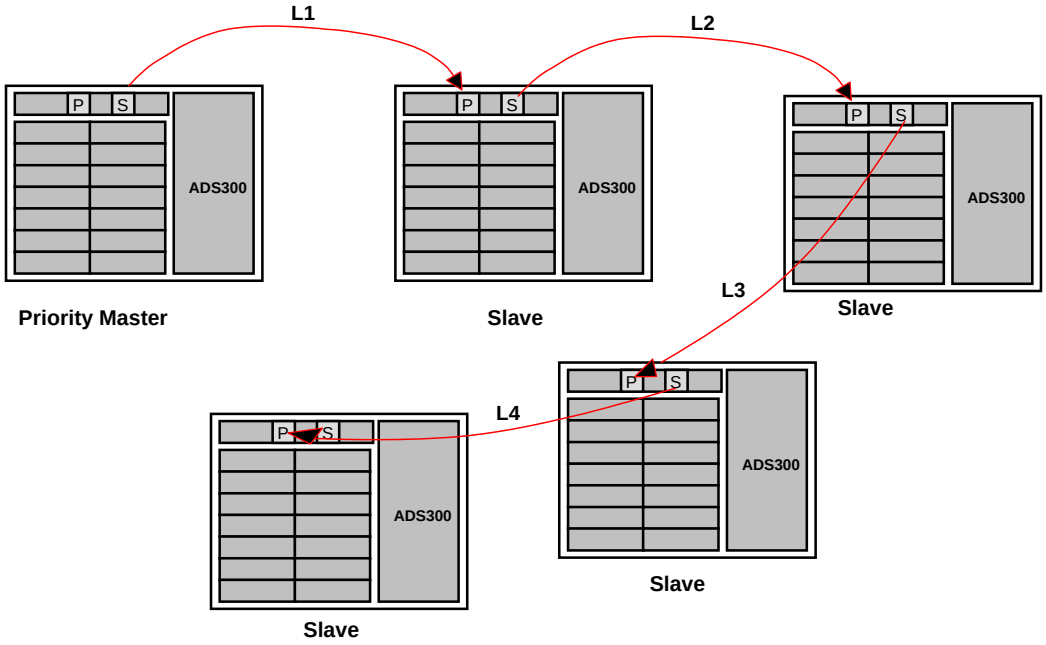


Figure 7-8: Multi-site synchronization with UCT-L/UCT-S in Simplex mode (series wiring)

Series wiring in Duplex mode

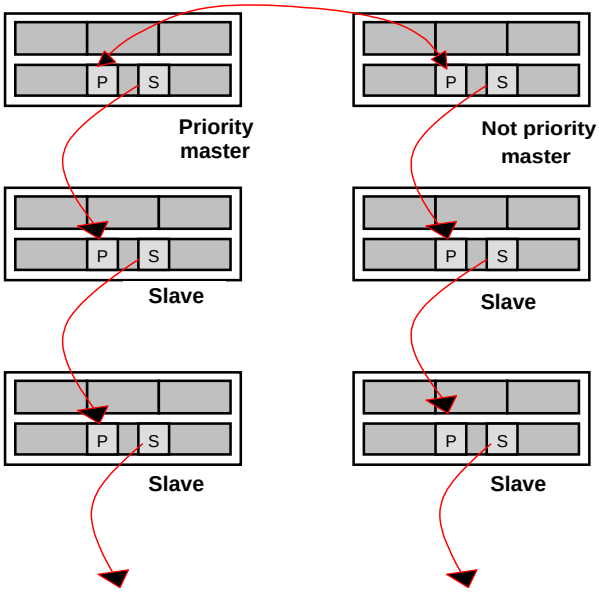


Figure 7-9: Multi-site synchronization with UCT-L/UCT-S in Duplex mode (series wiring)

The two "Master" PBXs are connected via their primary port. The "Slave" PBXs are connected in series from the secondary ports of the "Master" PBXs.

For series wiring (Simplex or Duplex mode), the following rules must be respected:

- There are no particular postioning rules to be followed for the slaves behind the two "Master" PBXs. In Simplex mode in particular, all the slaves are wired in series behind a single Master PBX.
- In Duplex mode, the two "Master" PBXs must be no more than 10 meters apart.
- The maximum distance in meters between a Master PBX and the last slave in series wiring is:
  D= (9760 - 50*N) / 5.5
  N = number of PBXs in between
  D = sum of the lengths of the synchronization cables used between the PBXs from the secondary port of the "Master" up to the primary port of the first "Slave".

  In the Simplex mode wiring example this gives:
  D = (9760 - 50*3)/5.5 = 1747 => L1+L2+L3+L4 $\leq$ 1745 m
- The sum of the lengths of the two intermediate sections must be less than 600 meters. If the series wiring includes only one Slave, the length of the synchronization cable linking the Slave to the Master must likewise be less than 600 meters.
  In the Simplex mode wiring example this gives:
  L1 + L2$\leq$ 600 meters
  L2 + L3$\leq$ 600 meters
  L3 + L4$\leq$ 600 meters
- STP5 cable only must be used for the wiring.

Star wiring (Duplex mode)

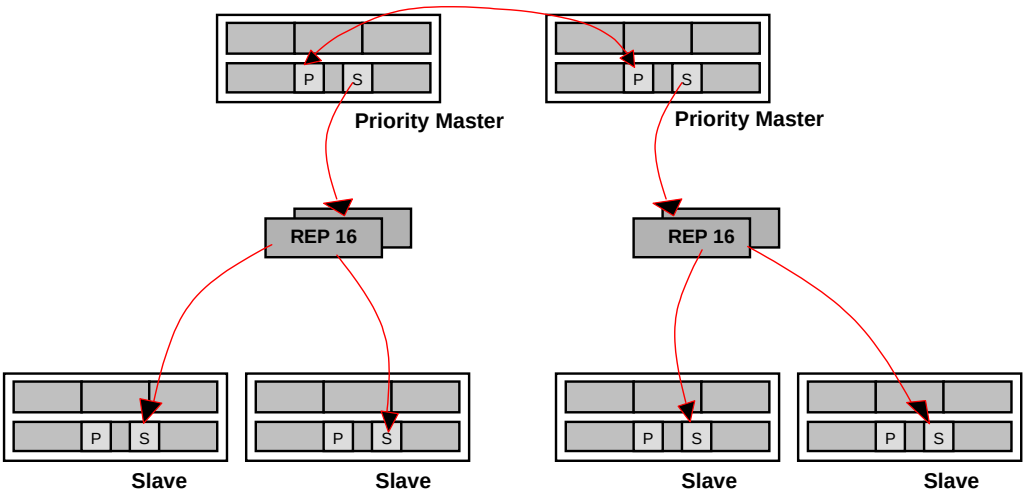


Figure 7-10: Multi-site synchronization with UCT-L/UCT-S in Duplex mode (star wiring)

The two "Master" PBXs are connected via their primary port. Their Slave port powers a REP16 module to which a maximum of 16 slave PBXs can be connected. Each repeater stage comprises two units, the first to distribute the bit clock and the second to distribute the multiframe clock.

For star wiring the following rules must be respected:

- There are no particular postioning rules to be followed for the slaves behind the two "Master" PBXs. In Simplex mode in particular, all the slaves are wired in series behind a single Master PBX.
- In Duplex mode, the two "Master" PBXs must be no more than 10 meters apart.
- STP5 cable only must be used for the wiring.
- The repeaters can be organised in cascade.
- The maximum distance between the secondary port of a PBX and the repeater module is 600 meters.
- The maximum distance between a repeater module and the primary port of a PBX is 600 meters.
- The maximum distance in meters between a Master PBX and a Slave PBX is:
  D = (9760 - 50*N) / 5.5
  N = number of repeaters crossed
  D = sum of the lengths of the synchronization cables used between the secondary port of the Master and the primary port of the slave.

Mixed wiring (Duplex mode)

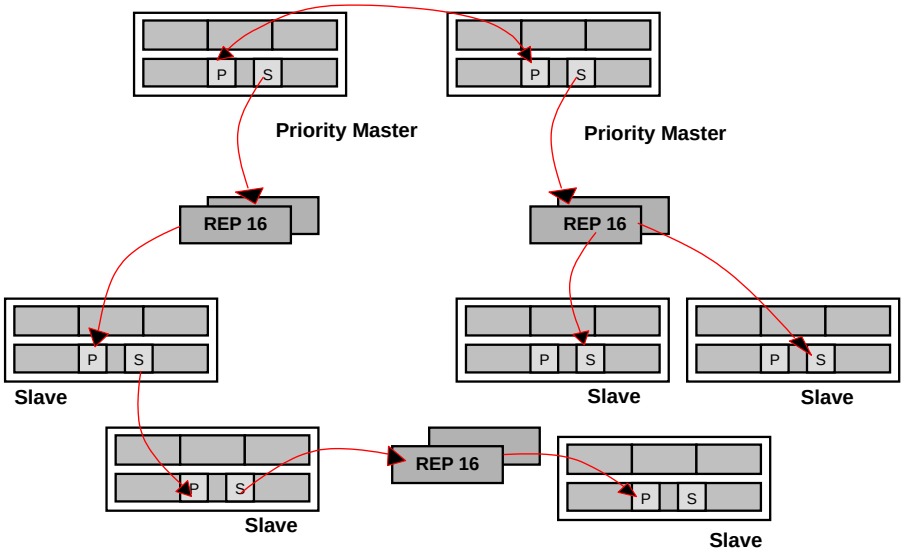


Figure 7-11: Multi-site synchronization with UCT-L/UCT-S in Duplex mode (mixed wiring)

Series wiring and star wiring are combined.

The two "Master" PBXs are connected via their primary port. Their Slave port powers a REP16 module to which a maximum of 16 slave PBXs can be connected.

The rules to be respected are those given for series wiring and star wiring in the corresponding sections.

The maximum distance in meters between a Master PBX and the last Slave PBX in a chain is:
D = (9760 - 50*N) / 5.5
N = number of slave PBXs and/or repeaters crossed
D = sum of the lengths of the synchronization cables used between the secondary port of the Master and the primary port of the slave.

7.4.3 Wiring of synchronization ports

Important: DECT synchronization wiring between the two NeXspans must be done using only an STP5 cable.

- Master - Slave and Slave - Slave wiring (ISDN straight wiring)

	Signal	RJ45 S DECT (J7B)	RJ45 P DECT (J7A)
1st pair 2.048 MHz clock	PHBIT	6	6
	NHBIT	3	3
2nd pair DECT 800 ms clock	PHDECT	5	5
	NHDECT	4	4

Tableau 12 : Wiring of synchronization ports (Master - Slave and Slave - Slave)

- Priority Master - Not priority Master wiring (ISDN straight wiring)

Signal	Priority Master RJ45 P DECT (J7A)	Not priority Master RJ45 P DECT (J7A)
AHGA	1	1
AHGB	2	2
HEXTA	7	7
HEXTB	8	8

Tableau 13 : Wiring of synchronization ports (priority Master - not priority Master)

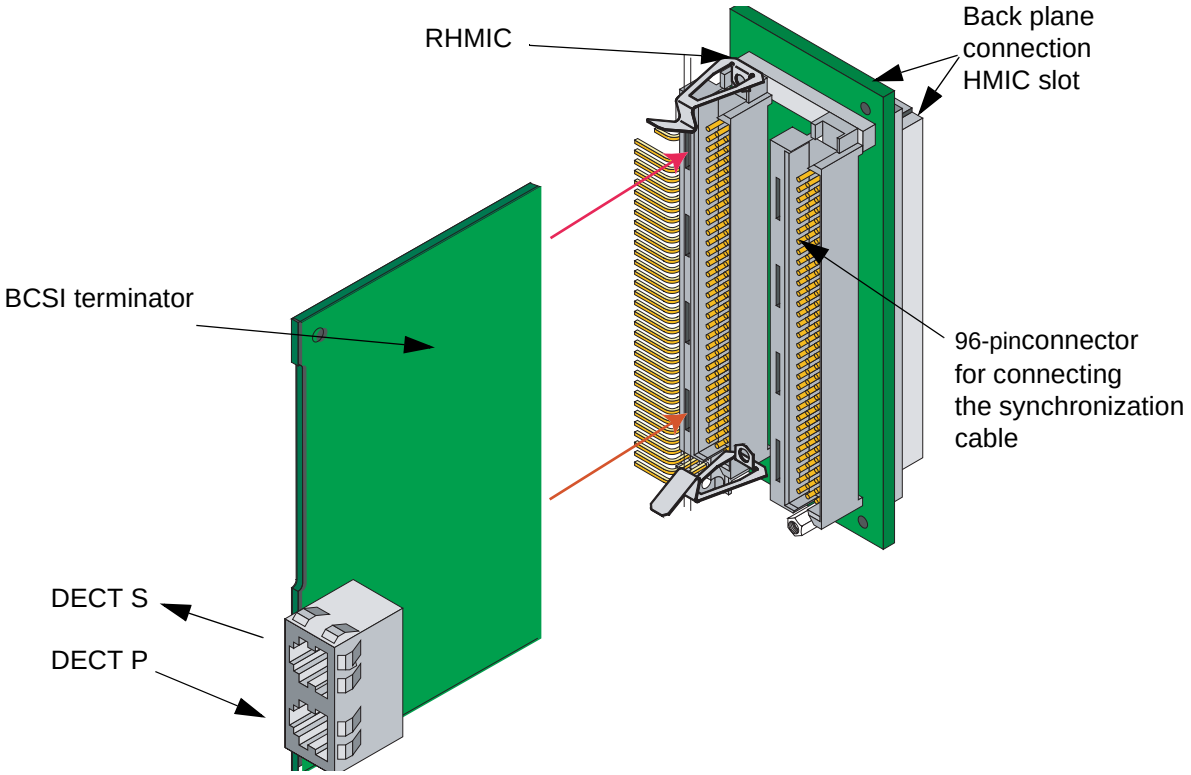
7.5 synchronization on NeXspan 50 with CSI

7.5.1 Principle

In a configuration comprising several (contiguous) PBXs fitted with a CSI card, you do not need to wire the DECT base stations with a third pair for synchronization. Multi-site DECT synchronization on NeXspan 50 requires the RHMIC and BCSI boards to be installed. The RHMIC board is connected to the rear of the back plane of shelf FPHBG2 on the HMIC connector. It is fitted with two 96-pin connectors for connecting the BCSI card and the synchronization cable. The BCSI board, connected to the RHMIC board, synchronizes the USB boards in NeXspan 50s to provide a DECT synchronous multisite network offering DECT mobiles the inter-site handover function.

The BCSI board sends or receives the DECT synchronization and the 2.048 MHz bit synchronization to/from another PBX; it determines the compensation to make on the DECT clock received according to the distance of the transmitting PBX and retransmits the clocks received to the CSI card.

The BCSI board has two synchronization ports (RJ45 connectors): a DECT S secondary port (in output) and a DECT P primary port (in input), compatible with those of M6501L/R IP and NeXspan S/L/D PBXs.



"Master" and "Slave" mode:
The synchronization ports work in the following modes:

- "Master"mode: the signals from the secondary port transmit the 2.048 MHz bit clock and reference DECT synchronization from the "master clock" CSI board to a PBX in slave mode.
- "Slave" mode: the 2.048 MHz bit clock and DECT synchronization are received from a synchronization port of the PBX in master mode and synchronize the CSI boards connected to the BCSI.

The use of "Master" or "Slave" mode is automatically configured by the BCSI board (if a clock is detected on the primary port, slave mode is used).

The secondary port of the master or N slave is connected to the primary port of the first slave or slave N+1.

Note: *the maximum connection cable length from one port to the other is 600 m.*

7.5.2 Configuration

The default (factory) configuration of the switches on the BCSI board is as follows:
CA1 and CA2 = ON
Binary value: ON = 0 ; OFF = 1

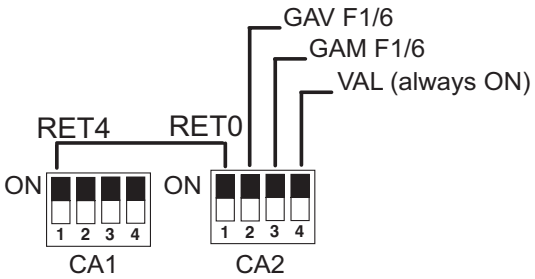


Figure 6-14: Default configuration (factory configuration) of switches CA1, and CA2 on the BCSI board

Configuration on "Master" PBX:

- The type of PBX downstream of the "Master" must be indicated (F1/F6 or F4, manual configuration). A switch (screen printing: GAVF1/6) on the BCSI is used to define the type of PBX downstream:
  - GAVF1/6 set to ON: defines an F1/F6 PBX downstream
  - GAVF1/6 set to OFF: defines an F4 PBX downstream
- Check the configuration of switches CA1, CA3 and CA4 on the CSI card. Their configuration must be the same as the factory configuration (see mono-site synchronization, Section 5.4).
- Check the configuration of switches CA1, CA2 and CA3 on the RMH cards for all clusters (see mono-site synchronization).

Configuration on a "Slave" PBX:

- The types of PBX downstream and upstream of the "Slave" must be indicated (F1/F6 or F4, manual configuration). A switch (screen printing: GAVF1/6) on the BCSI is used to define the type of PBX downstream:
  - GAVF1/6 set to ON: defines an F1/F6 PBX downstream
  - GAVF1/6 set to OFF: defines an F4 PBX downstream

  A second switch (screen printing: GAMF1/6) on the BCSI is used to define the type of PBX upstream:
  - GAMF1/6 set to ON: defines an F1/F6 PBX upstream
  - GAMF1/6 set to OFF: defines an F4 PBX upstream

- The compensation of the synchronization signal propagation time between the "Slave" PBX and the "Master" PBX must be defined: 5 switches are used (serial printing: RET4-0, each switch = step of 100 meters).

$$\Delta T = 900 \times 5,5 = 4950 ns$$

Distance (in meters)	RET 4	RET3	RET2	RET1	RET0
0 à 100	on	on	on	on	on
100 à 200	on	on	on	on	**OFF**
200 à 300	on	on	on	**OFF**	on
300 à 400	on	on	on	**OFF**	**OFF**
400 à 500	on	on	**OFF**	on	on
500 à 600	on	on	**OFF**	on	**OFF**
600 à 700	on	on	**OFF**	**OFF**	on

$$V = \frac{9760 - 4950}{488} = 9,856$$

Note: *Binary value : ON = 0 ; OFF = 1*
When adding a synchronization delay, the ON position of the switches signifies 0 (and thus a delay of 0 seconds).

- Check the configuration of switches CA1, CA3 and CA4 on the CSI card. Their configuration must be the same as the factory configuration (see mono-site synchronization).
- Check the configuration of switches CA1, CA2 and CA3 on the RMH cards (see mono-site synchronization).

LED

A BCSI LED on the front panel of the CSI card gives information about DECT multi-site synchronization:

STATE	EXPLANATION
OFF	No BCSI card connected
Flashes green	BCSI card present but no incoming (for a master PBX) DECT synchronization signal
On steady green	Incoming DECT synchronization signal on the BCSI card (for a slave PBX)

Tableau 15 : Meaning of DECT multi-site synchronization on CSI card front panel

7.5.3 Wiring of synchronization ports

ISDN straight wiring:

	Signal	RJ45 DECT S	RJ45 DECT P
1st pair 2.048 MHz clock	PHBIT	6	6
	NHBIT	3	3
2nd pair DECT clock	PHDECT	5	5
	NHDECT	4	4

Tableau 16 : Wiring of synchronization ports

The synchronization port on an F4 has a wiring restriction: when a repeater is used downstream of an F4, all the PBXs downstream of the repeater must be of the same type: F1/F6 or F4.

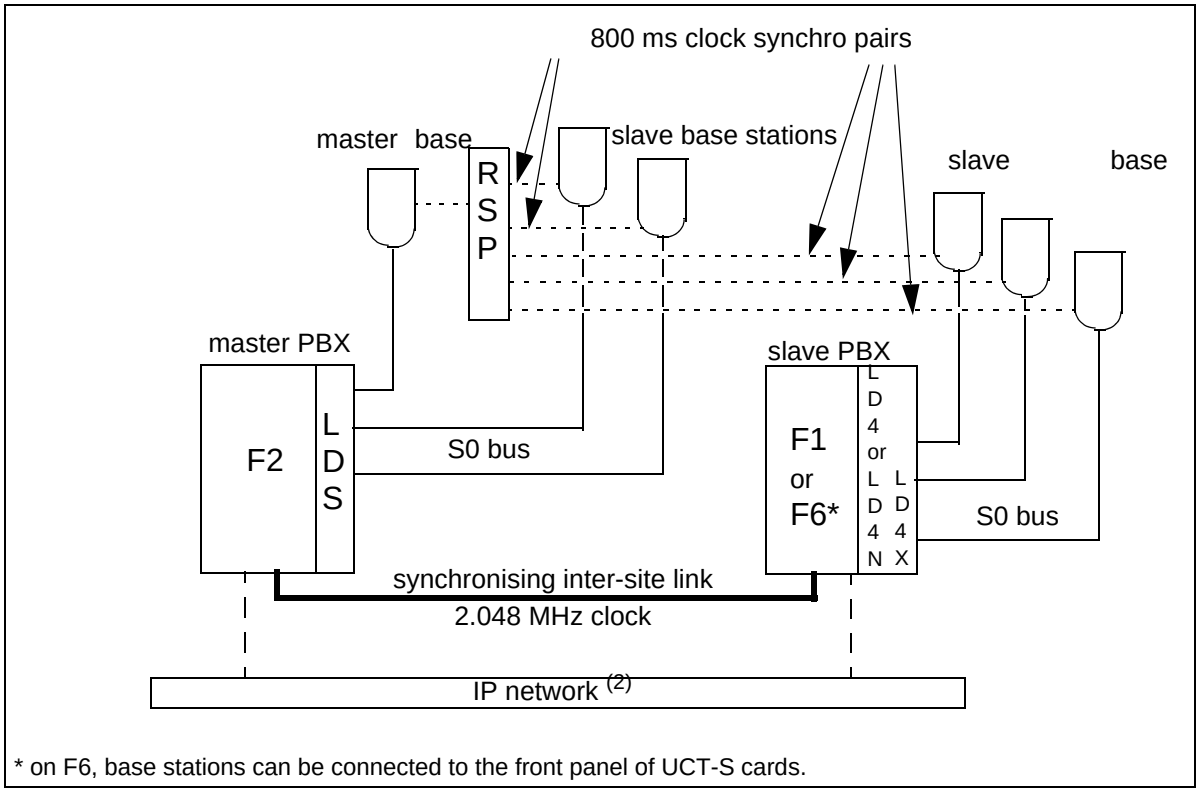
7.6 Examples

7.6.1 F1/F2 or F6/F2 contiguous multi-site configuration

The slave PBX must be synchronized via an inter-site link (2.048 MHz clock).

The base stations must be wired in three pairs (F2 has no synchronization port + LD4/LDS, LD4NX/LDS combination). The synchronization pair carries the 800 ms clock.

Note: *The LD4X mode (removing the J14 jumper on an LD4NX card and used to implement additional functions) is only compatible on NeXspan S/L/D with software release R4.1 and above.*



* on F6, base stations can be connected to the front panel of UCT-S cards.

(1) : use a repeater if there are more than 5 slave base stations

(2) : even in an IP multi-site network, as the IP network is not synchronising, the PBXs must be connected by a synchronising inter-site link.

Figure 7-17: F1/F2 or F6/F2 contiguous multi-site configuration

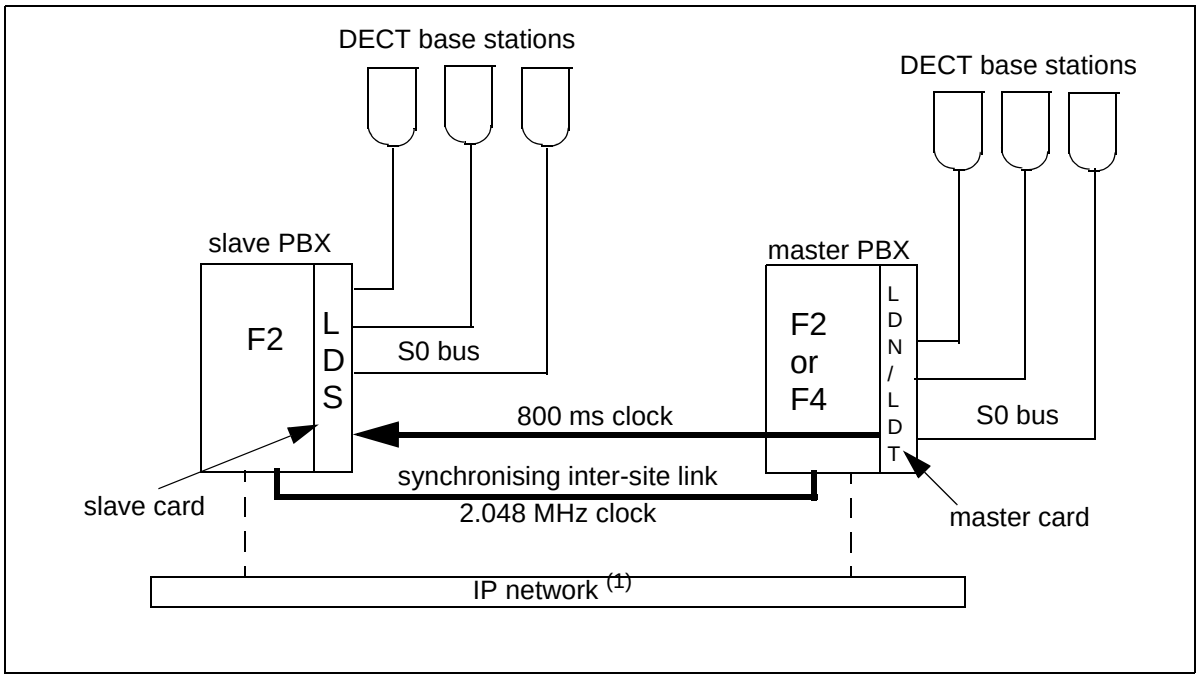
7.6.2 F2/F2 or F4/F2 contiguous multi-site configuration

The slave PBX must be synchronized via an inter-site link (2.048 MHz clock).

The base stations must be wired in two pairs. The synchronization signal is carried by the M bit in the S frame.

One LDS or LDT card must be declared master and the other slave. The master card 800 ms clock (SYN outgoing differential signal) must be connected to the slave card (via the distribution frame - terminal strip 4G).

Note: *F2 has no synchronization ports; so for a multisite synchronization between an F2-F4 fitted with FPHBG/CSH or an F2-F4 fitted with FPHBG2/CSI/BCSI, the configuration of the multisite synchronization is the same.*



(1) : even in an IP multi-site network, as the IP network is not synchronising, the PBXs must be connected by a synchronising inter-site link.

Figure 7-18: F2/F2 or F4/F2 contiguous multi-site configuration

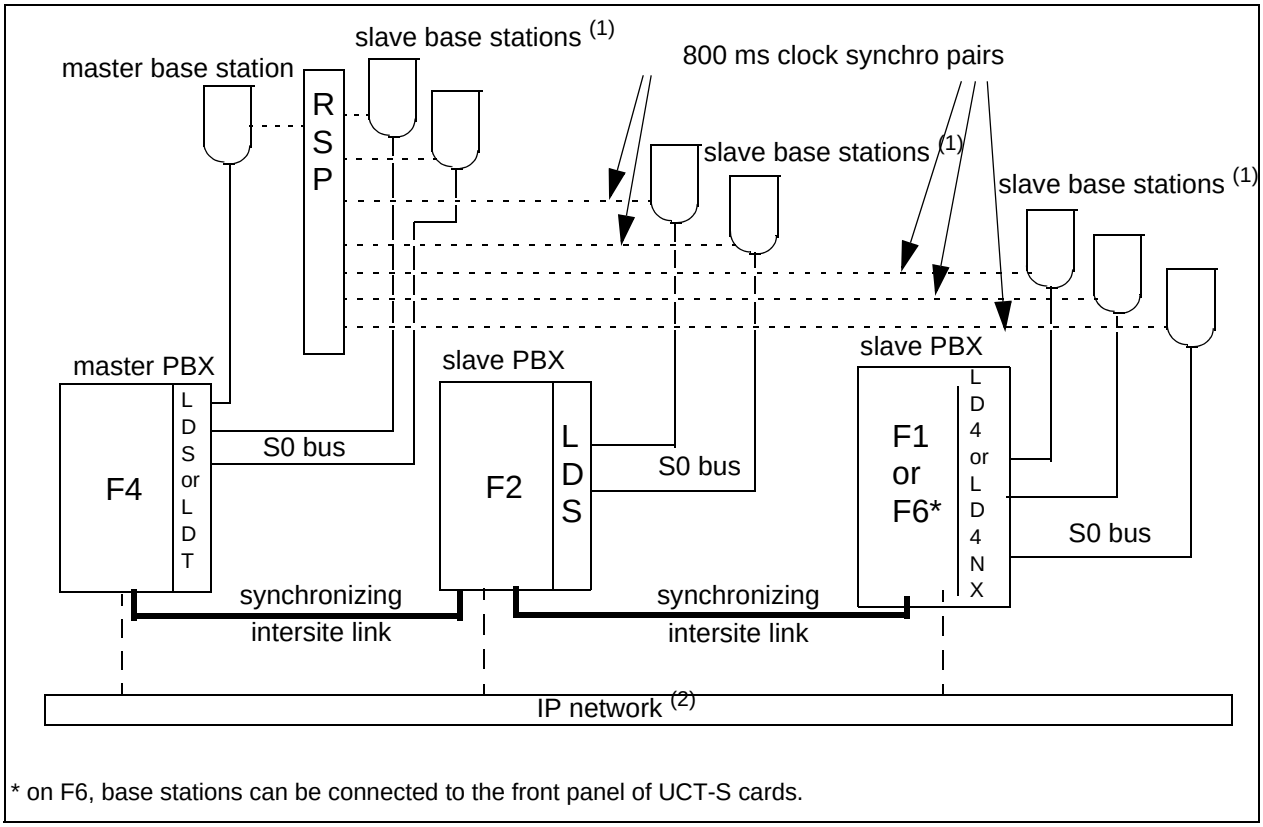
7.6.3 F1/F2/F4 or F6/F2/F4 contiguous multi-site configuration

The slave PBXs must be synchronized via inter-site links (2.048 MHz clock).

The base stations must be wired in three pairs (F2 has no synchronization port + LD4/LDS, LD4NX/LDS combination). The synchronization pair carries the 800 ms clock.

Note: *F2 has no synchronization ports; so for a multisite configuration between an F2-F4 fitted with FPHBG/CSH or an F2-F4 fitted with FPHBG2/CSI/BCSI, the configuration of the multisite synchronization is the same.*

Note: *The LD4X mode (removing the J14 jumper on an LD4NX card and used to implement additional functions) is only compatible on NeXspan S/L/D with software release R4.1 and above.*



(1) : use a repeater if there are more than 5 slave base stations

(2) :even in an IP multi-site network, as the IP network is not synchronising, the PBXs must be connected by a synchronising inter-site link.

Figure 7-19: F1/F2/F4 or F6/F2/F4 contiguous multi-site configuration

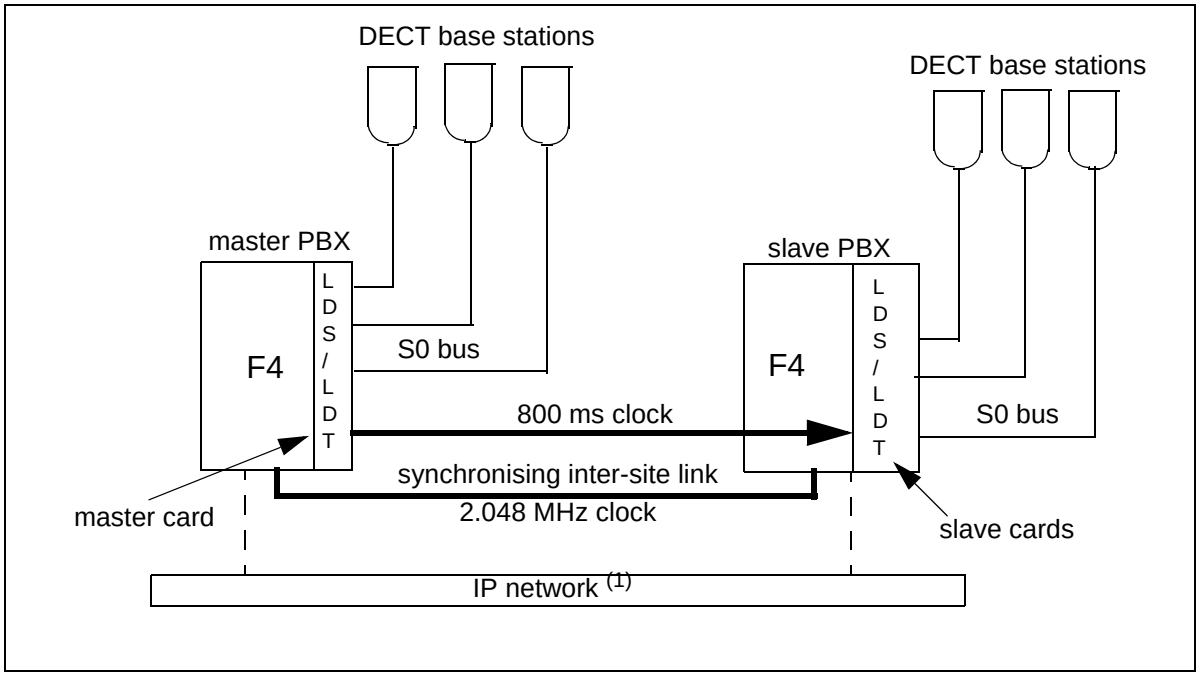
7.6.4 F4/F4, F4/F6 or F4/F1 contiguous multi-site configuration

Case of multisite F4/F4 device with an F4 equipped with an FPHBG back plane and CSH, LDS and/or LDT cards

The slave PBX must be synchronized via an inter-site link (2.048 MHz clock).

The base stations must be wired in two pairs. The synchronization signal is carried by the M bit in the S frame.

One LDS or LDT card must be declared master and the other LDS/LDT cards slave. The master card 800 ms clock (SYN outgoing differential signal) must be connected to the slave card (via the distribution frame - terminal strip 4G).



(1) : even in an IP multi-site network, as the IP network is not synchronising, the PBXs must be connected by a synchronising inter-site link.

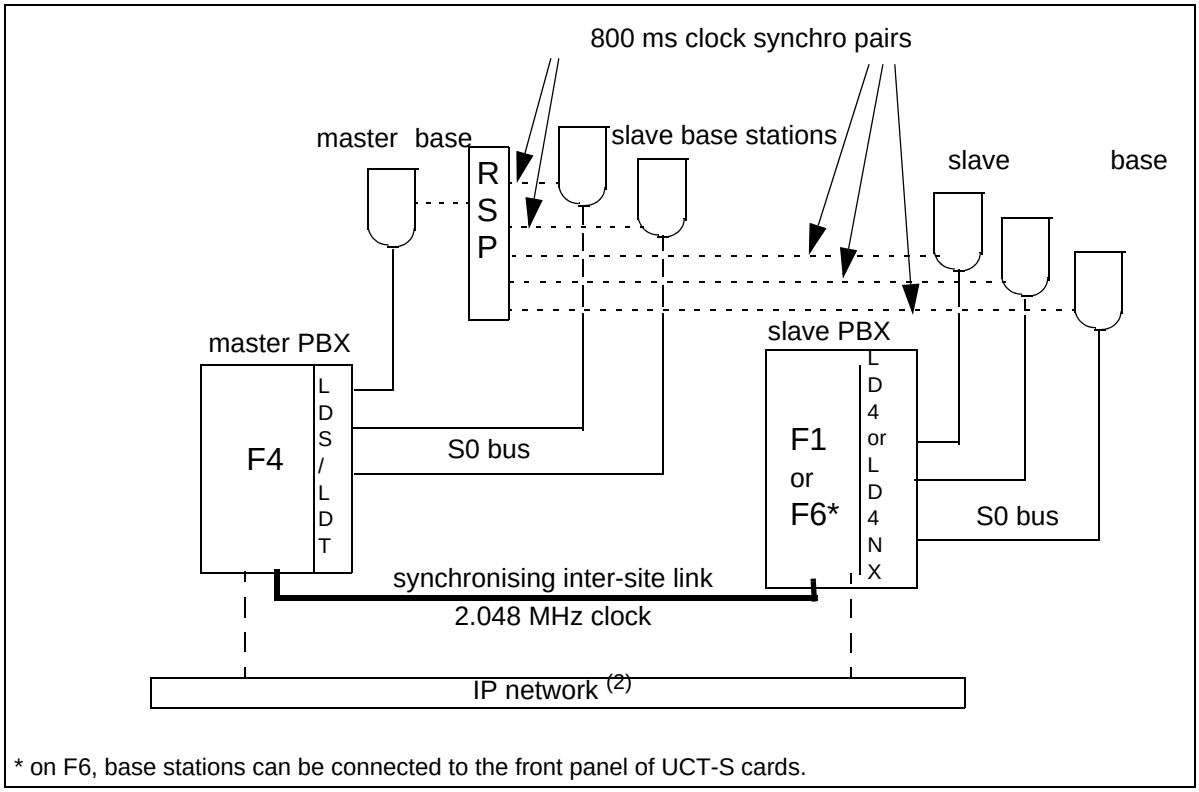
Figure 7-20: Contiguous multisite F4/F4 (with F4 fitted with FPHBG/CSH/LDS/LDT card)

Case of multisite F4/F6 or F4/F1 device with F4 equipped with an FPHBG back plane and CSH, LDS and/or LDT cards

The slave PBX must be synchronized via an inter-site link (2.048 MHz clock).

The base stations must be wired in three pairs (combination of LD4/LDS (or LDT), LD4NX/LDS (or LDT) card). The synchronization pair carries the 800 ms clock.

Note: *The LD4X mode (removing the J14 jumper on an LD4NX card and used to implement additional functions) is only compatible on NeXspan S/L/D with software release R4.1 and above.*



(1) : use a repeater if there are more than 5 slave base stations

(2) : even in an IP multi-site network, as the IP network is not synchronising, the PBXs must be connected by a synchronising inter-site link.

Figure 7-21: Contiguous multisite F4/F6 or F4/F1 (with F4 fitted with FPHBG/CSH/LDS/LDT card)

Case of multisite F4/F4, F4/F6 or F4/F1 device with F4 equipped with an FPHBG2 back plane and CSI and LDT cards

The secondary port of the “Master” PBX is connected to the primary port of the “Slave” PBX.

The base stations must be wired in two pairs. The synchronization signal is carried by the M bit in the S frame.

Note: *For a multisite F4/F6, if the DECT base stations are connected to the integrated S0 accesses of a NeXspan S CPU board, a third pair is required for synchronization.*

Note: *The LD4X mode (removing the J14 jumper on an LD4NX card and used to implement additional functions) is only compatible on NeXspan S/L/D with software release R4.1 and above.*

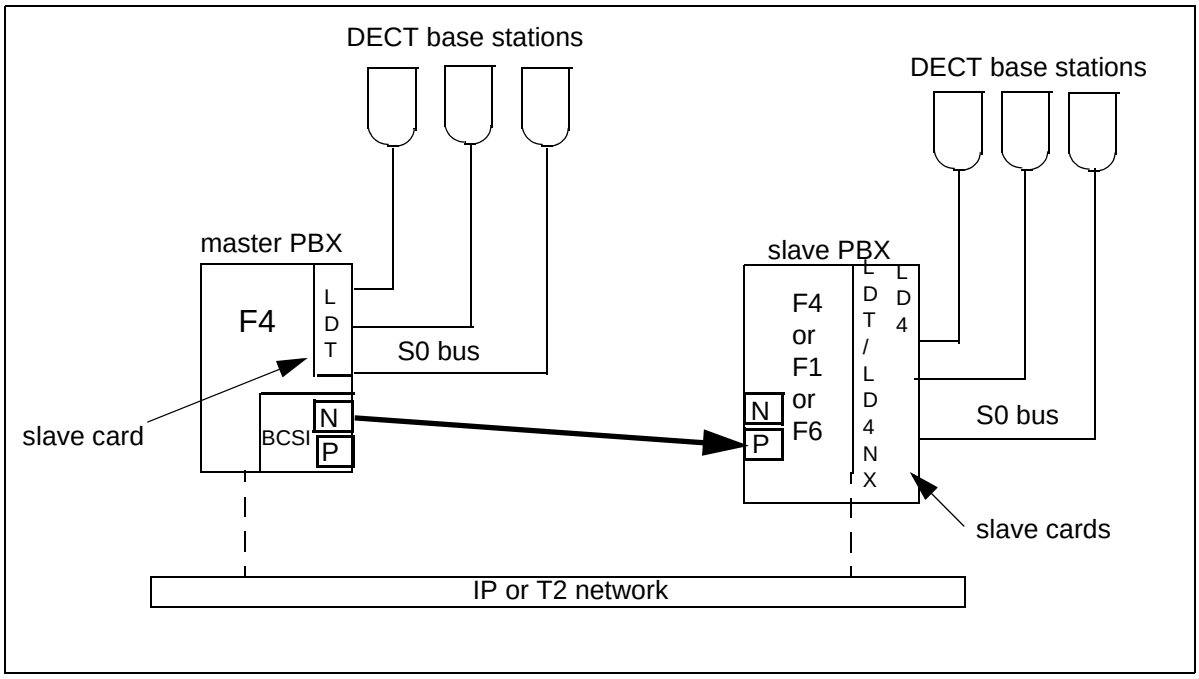


Figure 7-22: Contiguous multisite F4/F4, F4/F6 or F4/F1 (with F4 fitted with FPHBG2/CSI/LDT card)

7.6.5 F6/F1 or F6/F6 contiguous multi-site configuration in simplex mode

The secondary port of the “Master” PBX is connected to the primary port of the “Slave” PBX.

The base stations must be wired in two pairs. The synchronization signal is carried by the M bit in the S frame.

Note: *If the DECT base stations are connected to the integrated S0 accesses of the NeXspan S CPU card, a third pair is required for synchronization.*

Note: *The LD4X mode (removing the J14 jumper on an LD4NX card and used to implement additional functions) is only compatible on NeXspan S/L/D with software release R4.1 and above.*

Note: *At least OCT4 card equipped on the F1*

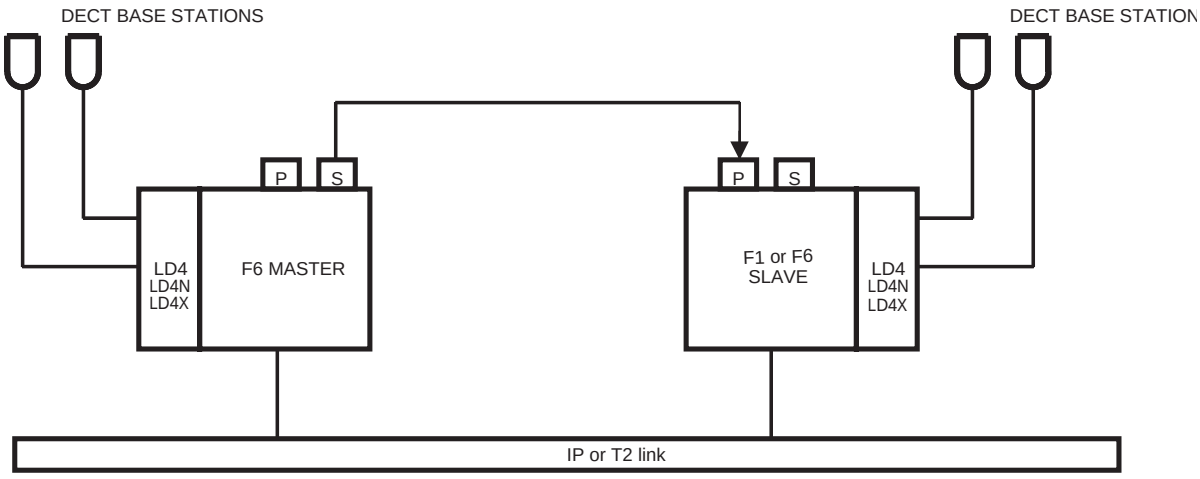


Figure 7-23: F6/F1 or F6/F6 contiguous multi-site configuration in simplex mode

7.6.6 F6-F6/F6 or F6-F6/F1 contiguous multi-site configuration in duplex mode

The two "Master" PBXs are connected via their primary port. The secondary ports of the “Master” PBXs are connected to the primary ports of the “Slave” PBXs.

The base stations must be wired in two pairs. The synchronization signal is carried by the M bit in the S frame.

Note: *If the DECT base stations are connected to the integrated S0 accesses of the NeXspan S CPU card, a third pair is required for synchronization.*

Note: *The LD4X mode (removing the J14 jumper on an LD4NX card and used to implement additional functions) is only compatible on NeXspan L/S with software release R4.1 and above.*

Note: *At least OCT4 card equipped on the F1*

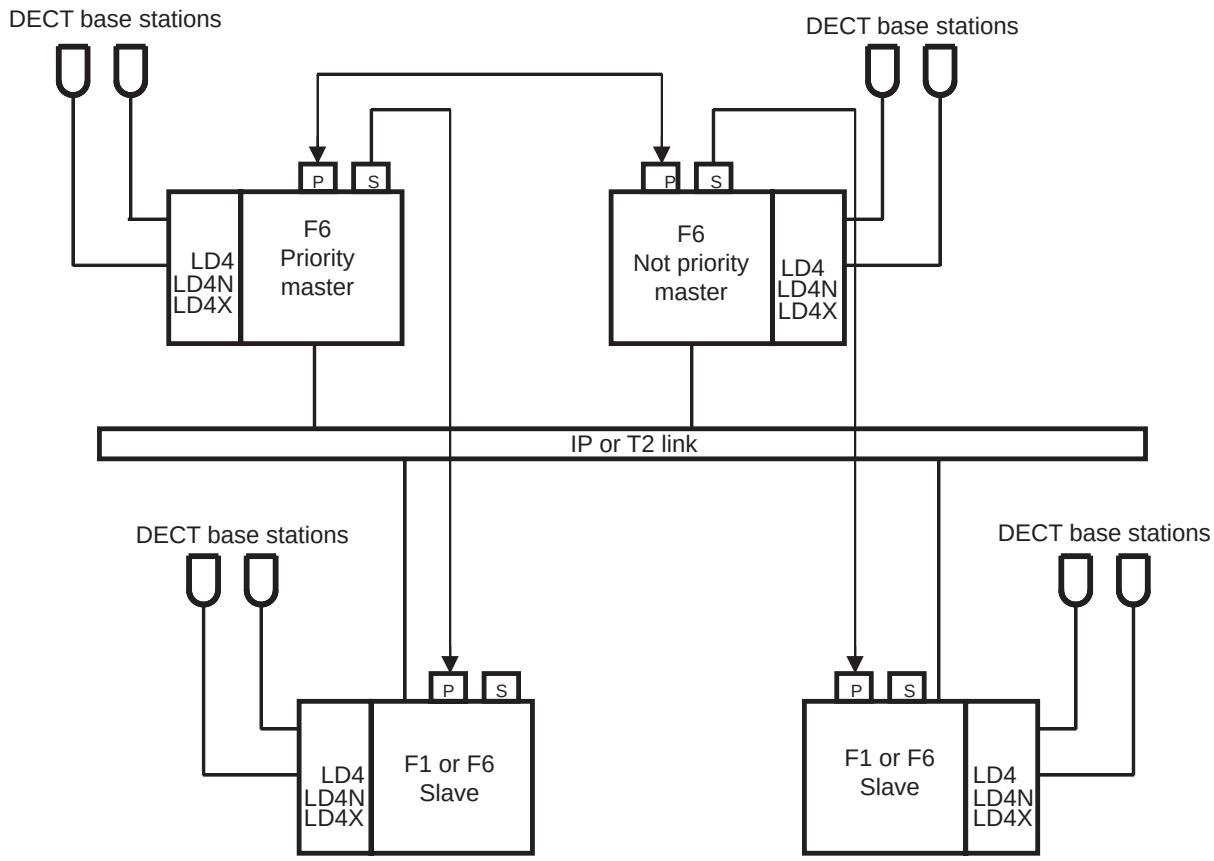


Figure 7-24: F6-F6/F6 or F6-F6/F1 contiguous multi-site configuration in duplex mode

Chapter 8 - Checking the installation

8.1 Preliminary operations

It is advisable to back up the customer configuration before beginning DECT programming.

Be sure to have the following information available:

- the PARI number,
- deployment information and plans

Note: *The PARI number can be found on the PBX approval label.*

8.2 Procedure

Before beginning implementation, check the conformity of the S0 interface cards, the power supplies, and the positions of the interface cards in the PBX and the configuration of the card switches (see chapter 4).

It is imperative to respect the order of the following procedures.

- Basic wiring checks
- Check the clock pair polarity when the synchronization type is "third pair".

8.2.1 Basic wiring checks

Checking the continuity and configuration of the pairs

- Visually check the configuration of each base station RJ45 connector and of each distribution frame.
- Cable test. Isolate the S0 side at the distribution frame and note the impedance of the wiring + base station assembly for the 2 or 3 pairs. The values observed must be the same for the transmit and receive pairs. The clock pair impedance must be greater than approximately 80 ohms.

Checking the distances between base stations and the distribution frame

Note the observed value of the transmit pair and determine the distance between the base station and the distribution frame using the following table.

Remote	- 6/10°cable,	- 5/10°cable,	- 4/10°cable,
100 m	18.2 ohms	24.0 ohms	34.0 ohms
210 m	31.6 ohms	43.8 ohms	64.8 ohms
330 m	46.3 ohms	65.4 ohms	98.4 ohms
450 m	60.9 ohms	87.0 ohms	132.0 ohms
570 m	75.5 ohms	108.6 ohms	165.6 ohms
690 m	88.9 ohms	128.4 ohms	196.4 ohms
800 m	103.6 ohms	150.0 ohms	230.0 ohms

Table 1: Determining the distance between base stations and the distribution frame

Chapter 9 - Programming for the NeXspan C/S/L/D range

9.1 Introduction

The steps for programming the DECT service are described for NeXspan C/S/L/D PBXs.

Note: *It is essential to follow the programming order given.*

1 PRELIMINARY OPERATIONS:

- Check the "internal" type data routing (menu 2.5 "Data management/Routes")

2 MANAGING TOPOLOGY

Declare the cells

Declare the DECT parameters

3 MANAGING RESOURCES

Name the trunk groups.

Define a trunk group.

4 PUTTING THE DECT SYSTEM IN SERVICE

Delete S0 subscribers.

Put the DECT interface cards in service.

Put the DECT base stations in service (downloading).

5 CHECKING THE PROGRAMMING PARAMETERS

Display the base stations.

Display the coverage.

6 REGISTERING AND PUTTING IN SERVICE THE MOBILES

7 MANAGING REGISTRATION PASSWORDS

9.2 Manage topology

MENU: 1.8.1 (Single-company management) or **1.9.1** (Multi-company management)

```
WIRELESS: TOPOLOGY
      1 NAMES OF FIRST CELLS
      2 NAMES OF LAST CELLS
      3 DECT PARAMETERS
```

9.2.1 Declare the cells

This screen allows you to declare the cells that were defined during deployment. The maximum number of cells is fixed at 128 (for a mono-site configuration) and 254 (for a multisite configuration).

MENU: 1.8.1.1 (Single-company management) or **1.9.1.1** (Multi-company management)

```
NAMES OF FIRST CELLS
     CELL    0          BUILD.A...
     CELL    1          BUILD.F...
     CELL    2            JPT.....
     CELL    3            ........
     CELL    4            ........
     CELL    5            ........
     ...
     CELL                       15
     ........
```

9.2.2 DECT parameters

MENU: 1.8.1.3 (Single-company management) or **1.9.1.3** (Multi-company management)

```
DECT PARAMETERS
     PARI VALUE 0                        .....
     RANDOM VAL RECORDED                  .....
     RS VAL RECORDED                   .....
     DIR. BEGINNING ASSIGNED TO PLL      999..


     CLOCK SYNCHRON.           PRIORITY MASTER
     CURRENT STATE       TRANSMITTER LOCAL CLK
```

Note: *For a multisite network, additional parameters appear, making it possible to define the list of sites on which the mobile terminals will be registered, see Chapter 11.*

- PARI VALUE: 9 digits maximum (the PARI number can be found on the PBX approval label).
- RANDOM VAL RECORDED and RS VAL RECORDED: maximum 9 digits.

  2 random values (must not be the same) registered in the mobile by the PBX when the mobile was registered on the DECT network. From this point onwards, the PBX regularly checks the values registered in the mobiles (the values are calculated from these two parameters) in order to authorise or refuse use of the DECT network.

  Enter a value lower than 4294967295 (FFFF FFFFh). The value of the random number has no significance. However, in a multi-site configuration the number must be identical in all locations where the mobiles are to be registered.

- DIR. BEGINNING ASSIGNED TO LLP: 4 digits maximum, 999 is the default.

  The base stations are connected to the PBX via an S0 Basic Rate Interface. One PLL (D channel) is used for signalling and downloading to the base stations. PLL directory numbers are comprised of digits recorded in this parameter followed by the base station declaration order number.

  Example: 999000, 999001, 999002, etc.

- CLOCK SYNCHRO: this line is used to configure the synchronisation of DECT clocks.

  3 options, "Priority master", "Not priority master", "Slave".

  - Case of a mono-site configuration : the default value for a site is "Priority master" (the site is assumed to be autonomous).
  - Case of a multi-site configuration : in simpex mode, only one PBX is configured in "priority master" mode and provides the DECT synchronisation signal to the entire multi-sites network. Other PBXs are configured in "slave" mode. In Duplex mode, there are two "master" PBXs (one PBX is configured in "priority master" and the other in "not priority master" mode) and they can provide the DECT synchronisation signal to the entire multi-sites network. Other PBXs are configured in "slave" mode (see Chapter 11 for a multi-site configuration in simplex and duplex mode).

- CURRENT STATE: Read-only line indicating the current state of the DECT synchronization. The possible states are : "TRANSMITTER", "TRANSMITTER NETWK CLK", "TRANSMITTER LOCAL CLK", "RECEIVER", "RECEIVER NOT OK", "RECEIVER POLARITY OK", "RECEIVER POLARITY NOT OK". It is thus possible to know:

  - whether the clock is taken from the network or the local clock,
  - whether a slave site takes its synchronization from the master or if It has become transmitteur due to a link problem with the master,
  - whether the cable polarisation is correct.

9.3 Resources

MENU: 1.8.2 (Single-company management) or **1.9.2** (Multi-company management)

```
WIRELESS: RESOURCES
     1 TRUNK GROUP NAMES
     2 TRUNK GROUP DEFINITION
     3 ALLOCATION OF BASE STATIONS
     4 BASE STATION DISPLAY LIST
     5 COVER DISPLAY
        ENTER YOUR CHOICE
```

9.3.1 Naming the trunk groups

One trunk group must be associated with one cell only. One cell contains from 1 to 8 base stations.

MENU: 1.8.2.1 (Single-company management) or **1.9.2.1** (Multi-company management)

```
TRUNK GROUP NAMES
     TRUNK GROUP 0          TG0....
     TRUNK GROUP 1          TG1....
     TRUNK GROUP 2          .......
     TRUNK GROUP 3          .......
     TRUNK GROUP 4          .......
     ...                    .......
     ...                    .......
     TRUNK GROUP 14         .......
     TRUNK GROUP 15         .......
```

9.3.2 Defining a trunk group

This menu allows you associate a trunk group index to this cell.

Cells are associated with trunk groups in two phases:

- the first involves naming the trunk groups; these names are chosen by the system installer.
- the second phase involves associating the previously defined trunk groups with the cells declared in the topology menu.

The above two operations allow you link a trunk group index to the cell.

9.3.3 Selecting a trunk group

MENU: 1.8.2.2 (Single-company management) or **1.9.2.2** (Multi-company management)

```
TRUNK GROUP DEFINITION
     SELECTION BY NAME        TG0
```

9.3.4 Associating the trunk group with the base station

```
TRUNK GROUP DEFINITION TG0
     LOCATED IN CELL          BLDG A
```

Note: *to declare a DECT trunk group in a cell, all base stations in the cell must be out of service. The number of base stations in a cell must never exceed 8.*

9.3.5 Checking the trunk group declaration

Check the radio coverage declarations using the Menu 1.8.2.6 (Single-company management) or Menu 1.9.2.6 (Multi-company management).

9.4 Putting DECT cards and base stations in service

Menus 1.8.2.3 (Single-company management) or 1.9.2.3 (Multi-company management) "Base station allocation" are used to declare and put in service 2- or 4-channel DECT base stations.

Follow the instructions below before using this menu.

9.4.1 Preliminary operations and checks

Before putting the base stations in service, carry out the preliminary operations below.

- Delete the S0 subscribers previously declared on the S0 accesses required for the DECT interfaces.
- Put the DECT interface cards in service.
- Check the status of the cards and base stations

9.4.2 Deleting S0 subscribers

The base stations are declared on the S0 accesses of the various S0 interface cards. Depending on previous subscriber registrations, all the subscribers declared on these accesses must be checked and, if necessary, deleted.

Use Menu 1.1.6.1 (Extension directory) and Menu 1.1.5 (Add/Delete Extensions).

9.4.3 Putting DECT interface cards in service

Use Menu 3.2.1 for putting in service a DECT interface card (LD4/LD4NX) and Menu 3.2.2 for putting in service DECT interface cards of the UCT CPU card (UCT-S and UCT-C).

1) Putting a DECT interface card in service

MENU 3.2.1 : Example of an XS

```
     COMMON BOARDS MANAGEMENT
          CARD 1-00 : TYPE            ..........
          CARD 1-01 : TYPE                  LD4
                    : IN SERVICE     ..........
          CARD 1-02 : TYPE            ..........
          CARD 2-00 : TYPE            ..........
          CARD 2-01 : TYPE            ..........
          CARD 2-02 : TYPE            ..........
```

- For each slot in the cabinets enter the name of the DECT interface card.
- In the "TYPE" field enter "IN SERVICE".

Note: *For details of the positions and names of the cards refer to the corresponding sections.*

2) Putting in service DECT interface cards of the UCT CPU card (UCT-S and UCT-C)

MENU 3.2.2 : Example of an XS

```
     MOTHER BOARD MANAGEMENT - MIGRATION

         UCT: HARDWARE VIEW            SOFTWARE VIEW
          XXS CONFIGURATION                      XXS
          DIG. IN 0-00: IN SERVICE       ..........
          ANAL IN 0-01: IN SERVICE       ..........
          S/T0 IN 0-02: IN SERVICE       ..........
          T0   IN 0-03: IN SERVICE       ..........
          PTX  IN 0-04: IN SERVICE       ..........
          HSCX IN 0-05: IN SERVICE       ..........
          BVF IN 0-06 : IN SERVICE       ..........

          DIGITAL SET   : 8                       8
          ANALOG SET    : 8                       8
          ONLY T0 ACCESS: 2                       2

          TMS VC5402     TYPE       5402: EXTENSION
          STATUS: IN SERVICE              ..........
```

- The position and status of the CPU card interfaces are shown in this menu. DECT interfaces of the CPU card are in position 0-02. Select "IN SERVICE".

9.5 Declaring and putting in service DECT base stations

When declaring each base station note its position on the diagram (cabinet/card/channel).

9.5.1 Declaring and defining a base station

Use Menu 1.8.2.3 or Menu 1.9.2.3 to select the DECT base station you wish to put in service. Three types of selection are proposed:

- by its equipment number in the cabinet
- by the number of the trunk group to which the base station belongs
- by the number of the cell to which the base station belongs

```
      RADIO BASE SELECTION
          BY EQUIPMENT NUMBER     .....
          OR BY ITS TRUNK GROUP        .....
          OR BY ITS CELL      .....
```

When the selection is complete, the secreen for defining the base station parameters is displayed:

```
     RAD. BASE DEFIN. 0-0-02 DECT
          STATUS IN SERVICE                .........
          RAD.BASE TYPE                     2 CHAN.
          BELONGS TO TRUNK GROUP               .FX0...
          MOBILE RECORDING ALLOWED                        NO
          FRAME TS 0->11 AFFECTATION     PAIRS
          0->9 FREQUENCY ALLOCATION      1111111111
          - FREQUENCY NO. MODIF                        .
          ANTENNA SELECTION                 AUTOMATIC
          SYNCHRONIZATION           ADDITIONAL PAIR SLAVE
          DISTANCE FROM MASTER BS     D < 100 METRES
          TYPE OF BUS                       SHORT
```

- STATUS: this parameter indicates the current state of the base station.
- RAD.BASE TYPE: this parameter indicates the type of base station (2- or 4-channel).
- BELONGS TO TRUNK GROUP: this parameter indicates the name of the PBX trunk group linked to the base station.
- MOBILE RECORDING ALLOWED: this parameter must be set to "YES" during mobile registration if the base station is used for registration. When mobile registration is complete, enter "NO" in this field to avoid fraudulent registrations. If the mobile registration procedure fails, it is recommended to activate one or more neighbouring base stations during registration.

- SYNCHRONIZATION: this parameter indicates the type of synchronization:
  - synchronization via M bit of the S frame
  - external synchronization using an additional pair (master base station)
  - external synchronization using an additional pair (slave base station).

Note: *If the DECT base stations are connected to the integrated S0 accesses of the NeXspan S CPU card, a third pair is required for synchronization (use external synchronization via an additional pair).*

- TS ASSIGNMENT AND FREQUENCY ALLOCATION: these are default values and should not be changed.
- ANTENNA SELECTION: it is possible to connect two external antennas to the upper connectors of the base station. In this case, it may be necessary to force antenna selection. In the majority of cases enter "AUTOMATIC".
- DISTANCE FROM MASTER BS:

1 If synchronization is via the M bit, the distance is that between the base station and the S0 interface master card.

2 If synchronization is external (slave base station), this option compensates for propagation time due to the distance between the master base station and the slave base station.
  - The master base station should be located as close as possible to the distribution frame.
  - Specify the distance between the slave base stations and the master base station in 100-meter intervals.

- TYPE OF BUS: SHORT / LONG

  This option allows you to manage signal attenuation according to the distance between the PBX and the master base station (Short bus <130 m and long bus > 130 m).

- Putting the radio base station in service

  In the previous screen "RAD. BASE DEFIN."
  - Validate the base station parameters.
  - The base station is automatically put in service by downloading through a PLL link via the S0 interface.

9.6 Checking the programming

9.6.1 Display the base stations

Displaying the base stations enables you to carry out a final check of the declared base stations.

MENU: 1.8.2.4 (Single-company management) or **1.9.2.4** (Multi-company management)

```
DISPLAY. STAT.
     EQUIP    NB TYPE      STATUS       TRUNK GP CELL
     ---------------------------------------------
     0-02-02 00  2 CHAN.  IN SERVICE     TG0  CELL0
     1-00-00 08  4 CHAN.  IN SERVICE     TG1  CELL1
     1-00-01 08  4 CHAN.  IN SERVICE     TG1  CELL1


     ISDN EQT NO. AVAILABLE   TYPE
     ---------------------------------------------
     0-02-00      REMOTE-SUPPLY     S0
     1-00-02 NOT REMOTE-SUPPLIED    S0
     1-00-03      REMOTE-SUPPLY     S0
```

Note: *The remote power supply information is given for each S0 access fitted on the CPU card (UCT-S, UCTS-12 or UCT-C) and for LD4N cards S0 accesses in LD4X mode equipped in the PBX.*

9.6.2 Display coverage

This menu allows you to display the base stations declared according to the following parameters:

- Location in the PBX.
- Type.
- Status: FREE, OUT OF SERV., LOADING.
- Associated trunk group.
- Cell in which the base station is located.

MENU: 1.8.2.6 (Single-company management) or **1.9.2.6** (Multi-company management)

```
          USED BY: COMPANY  DEPARTMENT
          ----------------------------
               ******** ******


          AREA     CELL        TRK GRP   NO. OF BS
          ------------------------------------
          AREA 0   CELL 0   TG 0             1
          ........ CELL 1   TG 1             1
```

9.7 Registration and putting in service

9.7.1 Declaring a mobile in the PBX

A mobile must be created for each subscriber.

MENU 1.8.3.1 (single-company) or **1.9.3.1** (multi-company)

```
          CREATE MOBILE
          ----------------------
          DIRECTORY NUMBER                 7542.
          COMPANY                          AASTRA
          DEPARTMENT                          115..
          WIRELESS TYPE                 DECT
          REFERENCE CELL           .......
          DIRECTORY    OF    EMERGENCY    EXTENSIONS
          .......
```

1 Enter the directory number to be assigned to the mobile.

2 Reference cell, not used in DECT service (do not fill in).

3 Enter the backup set to which the mobile's calls will be directed when it is out of service or not located (out of coverage area range). If no backup set is declared, external calls will be forwarded to the attendant console, and internal calls will receive the busy tone.

4 In the "TELEPHONY MANAGEMENT" menu under "EXTENSION DATA" it is possible to modify the subscriber's restrictions and features.

Menu 1.1.1 Extension characteristics

```
DECT MOBILE EXTENSION

SUBSCR. STATUS                IN SERVICE
DIRECTORY NUMBER                 7542.
DID DIRECTORY NUMBER PLAN 1      ......
EXTENSION NAME                 P.DUPOND
COMPANY                          AASTRA
DEPARTMENT                          115..
REFERENCE CELL           .......
INTEGRATED VOICE BOX (IVB)          NO
SERVICE BEARER                   SPEECH
DIRECTORY OF EMERGENCY EXTENSIONS     7778.
DAY CATEGORY             INTERNATIO.
NIGHT CATEGORY             INTERNATIO.
DAY TL CLASS                48.....

Etc.
```

Enter the information corresponding the user's profile and restrictions.

9.7.2 Deleting mobiles from the PBX

Mobiles are deleted from the PBX using the menu "Delete mobiles" **MENU 1.8.3.2** (Single-company management) or **1.9.3.2** (Multi-company management)

This menu is used to delete one or more mobile set subscribers.1

```
DELETE MOBILES
-----------------------
FIRST DIRECTORY NUMBER          7542.
LAST DIRECTORY NUMBER           .....
DELETE DIRECTORY RECORDS          NO
CONFIRMATION                          NO
```

Caution: *When a mobile is deleted by an MMC, you must also delete its registration on the mobile (in order to locally cancel its device access rights).*

9.7.3 Display mobiles

MENU 1.8.3.3 (single-company) or **1.9.3.3** (multi-company)

```
DISPLAY MOBILES
--------------------------
DIR.   TYPE   REC   MODEL   PID
-------------------------------
7540   DECT YES AFF 12 CAR
7541   DECT YES AFF 12 CAR
7544   DECT YES AFF 12 CAR
7545   DECT YES AFF 12 CAR
7546   DECT YES AFF 12 CAR
7547   DECT YES AFF 12 CAR
7548   DECT YES AFF 12 CAR
7549   DECT YES AFF 12 CAR
7550   DECT YES AFF 12 CAR
7551   DECT YES AFF 16 CAR
7552   DECT  NO   ......  ....
7554   DECT YES AFF 12 CAR
7555   DECT YES AFF 12 CAR
```

Note: *Subscriber 7552 has been created and is awaiting registration. Subscriber 7542 has been deleted.*

Chapter 10 - Programming for the Nexspan 50 or Nexspan 500 range

10.1 Introduction

The DECT service programming steps are described for NeXspan 50 or NeXspan 500 PBXs.

Note: *It is essential to follow the programming order given.*

1 **Deactivate the fibre tests (loop tests)**

MMC XCALEN (Value 31)

2 **Check the "local" type data routing**

MMC XACHEM

Caution: do not forget the network dialling code for a multisite configuration.

3 **Declare the TELBOR server**

To download to the base stations: RHM XTGTOT (Total sub-group number 4).

4 **Declare the radio zones**

MMC XSERVI

In a multisite configuration, a cluster routing must be created in all the sites.

5 **Declare the company/department profile**

Associate a company profile using the MMCs XSERAC/XACHMT (Object COMPANY-DEPT.) or the RESSOC tool (this requires a system reload).

6 **Put the cards in service**

To position and put into service LDS/LDT (software variant 23 for LDS and 28 for LDT) cards, use the MMC XETBLS.

Caution: A 16-interface LDS/LDT card can only be fitted as a card with 16 line interfaces (it cannot be fitted as an 8-interface card and the two cards are not interchangeable). An 8-interface LDS/LDT 8 card always uses an entire trunk (32 time slots), a 16-interface card uses 2 trunks (64 time slots).

7 **Declare the cells**

MMC XCELLU, Object: cells, registration zones: .0.

Start the declaration with cell 0 for single-site configurations (for multi-site: see chapter 13 Multi-site programming).

8 **Declare the DECT parameters**

MMC XLIGAB, Object: radio restrictions, Topic: DECT parameter.

The PARI number that identifies the system is always shown on a label on the outer casing.

The "RS" and "Rand f" numbers must be between 1 and 4 294 967 294 (they are used during registration of the mobile).

As standard, the prefix of the PLL used for downloading to the base stations takes the value 999.

Caution: If there is a link number for the PAD, EBVO, etc. with the value 9x, the system accepts the value 999 but in this case, the base stations will not switch to download mode (translation in the analysis tree-structure is finished). In this case, you should change this value.

The "Base station p0 bit synchronization delay" value must be set to 1.

The SARI number must be defined, and must be the same as the PARI number.

9 Associate cells and trunk groups

A cell must be associated with a single trunk group. A cell is single-cluster.

Use the MMC XBORFA, Object "Base station trunk group", to associate a company profile and a trunk group number with a cell number. This trunk group is a virtual trunk group and is used to associate the cell number with a physical equipment interface. For example, cell 0 can be associated with trunk group 0, cell 1 with trunk group 1, etc.

The maximum number of base stations per cell/trunk group is 8 (you are advised to configure only 6, with a view to expansion in order to increase traffic flow). It may be necessary to declare several cells. The area to which cells belong is always 0. In multi-site configuration, if the coverage areas overlap, you are advised to select different cell numbers for each of the sites (see chapter 13 Multi-site programming).

10 Declare the base stations

Use the MMC XBORFA to declare the base stations.

This MMC is used to associate a trunk group number with a physical equipment interface number and to determine the type of base station connected.

The line "Mobile recording allowed" must be set to "yes" at system startup. You are advised to set it to "no" when mobile registration is complete.

Once the base stations have been declared, their software is downloaded. This operation is performed using TELBOR via the PLL associated with the base station. It takes 10 mn to download the software to a base station.

The base stations are loaded in groups of no more than 16, and the time taken to load all the base stations depends on their number.

While downloading is taking place do not run any MMCs other than:

- display status of base stations already created,
- create new base stations.

If the base station does not load, check the following:

- wiring
- remote power supply (40 V or 48 V)
- configuration of the distance between the PBX and the base station, and the type of bus (short / long if greater than 130 m)
- local data routing, TELBOR.

11 Register a mobile password

MMC XSYSTM

Enter a 5-digit password: 12345 by default.

12 Declare and register a mobile

See Chapter 2, Registering an M90x mobile terminal

If the procedure fails, check the following:

- that the registration of the base station in service is authorised
- that the set has registration rights in its feature class
- that there is a registration password at the PBX end (do not change this password during installation)
- that the company/department of the mobile has a company profile that is correctly declared
- that the mobile is not already registered.

When registration is complete, make outgoing and incoming calls, checking the quality of speech transmission.

13 Back up the initial configurations

At this stage, it is worthwhile to back up the configuration.

Regular backups must be made throughout the progression of the operations.

14 After mobile declaration

Put the base stations in service one at a time and check that they function correctly. The base stations are put in service cell by cell.

15 Check overall operation

When the mobiles have been put in service, check the handover function on all base stations. To do this, make a call with the registered mobile and walk around the site, checking speech transmission and noting the RPN numbers of the base stations used.

You should be able to display all RPN numbers declared. If this is not the case, there must be a problem with clock synchronization between the base stations used and those that are absent (see section about clock configuration). This operation also allows you to check site coverage.

16 Check the other mobiles

Check that each mobile functions correctly.

10.2 Routing check

MMC "XACHEM , Object: Routing, Action: Display" is used to check local routing..

```
                ROUTING AND ANALYSIS

Obj.=ROUTING.                                        Action=Display
Routing=0..
-------------------------------------------------------------------
         Type of routing=LOCAL TO STANDARD SUBSCR.
Back-up routing for routings.=
                              =
Routing used for analysis=        902       952       962
                              =
                              =
                              =
                              =
                              =

Operation performed
```

For a multi-site configuration check that the network ID field for local analysis is set to yes.

```
                ROUTING AND ANALYSIS

Obj.=ANALYSIS.                                       Action=Display
Dialing to analyse=902......
-------------------------------------------------------------------

                                  Analyse=COMPLTD

Routing=0..        Access type=OTHER

Network ID=YES

Operation performed
```

10.3 Declare the TELBOR server

When being put in service for the first time, the base station is updated by downloading from the PBX, if necessary. The TELBOR server and a PLL are used for downloading from the PBX software.

The MMC XTGTOT "Action=Extend" is used to declare the TELBOR server.

The server characteristics can be checked in the same MMC, "Action=Display".

```
                    TOTAL GROUPS

Obj.=Total groups                        Action=Display

Input by subscr.=NO    Subscriber num=019.    Total sub-group number=4
--------------------------------------------------------------------------------
Reverse charging=Denied   Company=0..  Depart.=0.. Access rights list=...
Category=7.    Close group type=CSG

Out. CUG List=0000000000000001     Inbound=0000000000000001
                15------8------>0            15------8------>0
Nbr. Of L.C. equip.=16.     Nbr. L. C. outb.=0..        Nbr. L. C. inbound=0..
Server name=TELBOR                              Max. size data packet=128

Operation performed
```

The PLL can be displayed using the MMC XABONS. While the base station is being loaded (duration 10 mn), the PLL should be seen as in communication. Once loading is complete, the PLL is disconnected. The number 999000 is assigned to the first PLL, 999001 to the second, etc. (The PLLs are created automatically when the base stations are created).

```
                            ISDN SUBSCR.

 Object=Permanent link                          Action=Display
 Search=by data subscriber                Subscriber num.=999000..
 ------------------------------------------------------------Page=1-
 ----------------------------SUBSCRIBER IDENTITY---------------------
 CCU=3.                                          Board type=LDS_B
 Board=2                       Access=1.                 Bus=SHORT
 Company=0..                   Depart.=0..
 TEI=1.
 Status=DISCONNECTED                        L.C. occup.=0..


 Operation complete
```

10.4 Declare the radio zones

The MMC XSERVI is used to declare the radio zones.

The "Zone" field must be "**..**" and routing "local site" for a single-site configuration. For multisite configuration, a cluster routing must be created in all the sites containing DECT base stations. Example: "Local center" or "all sites and centers".

```
                    SERVICES MANAGEMENT
Obj.=Dept.                                      Action=Display
Sub-object=RADIO ZONE
---------------------------- SERVICE ACCESS -------------------------
Template CCU=2.
Zone=..
----------------------------- SERVICE DATA --------------------------
    1 : =Local center
    2 : =---
    3 : = ---

-------------------------------------------------------------------------
    Report=O.K.

Operation performed
```

10.5 Declare the company/department profile

Association of a company profile using the MMC XACHMT: object COMPANY-SERVICE or using the RESSOC tool (this requires a system reload).

In a real multi-company configuration, associate different profiles for each company-department pair.

```
                    TELEPHONE ROUTES

Object=CompDep route                            Action=Display
-------------------------------------------------------------------------
         Company=0..                               Depart.=0..

    Route list for 1 CO access=0
    Route list for 1 TL access=0

    Company profile=0.
```

10.6 Put the cards in service

The base stations are declared on the S0 accesses of the DECT interface cards. Depending on previous subscriber registrations, the subscribers declared on these accesses must be checked and, if necessary, deleted. To check the availability of the S0 accesses and delete any S0 subscribers present on the accesses to be used by the base stations, use the MMC XABONS, "Subscr S0" family.

To position and put in service LDS/LDT interface cards, use the MMC XETBLS.

To put an LDS/LDT card in service, define the following parameters in the MMC XETBLS, action "Equipment":

- cluster number (2 to 39) corresponding to the card slot,
- SBL family: BOARDS,
- SBL sub-family: CLX,
- Board Type: LDS/LDT (32 TS) or LDS/LDT (64 TS),
- CLX board number: 0 to 7
- Software variant 23 for LDS and 28 for LDT.

For the SBL equipment, the MMC will only run if the cluster is IN SERVICE or DEACTIVATED.

The MMC checks the type of LDS/LDT card declared (32 TS or 64 TS). If the card present is not the type declared, putting in service is refused.

The card equipment can be checked in the same MMC, "Action=Display".

```
                            SBL STATUS

Object=SBL STATUS                    Action=Display
                                      CCU=3.
------------------------------------------------------------------------------
SBL family  =BOARDS               SBL sub-family =CLX
Board number=2
------------------------------------------------------------------------------
                   SBL status=IN SERVICE
------------------------------------------------------------------------------
Board Type=LDS (32 TS)
                Software Variant=23    Synchronous bus number=4.


------------------------------------------------------------------------------
Operation performed
```

10.7 Declare the cells

The MMC XCELLU, Object "Cells", is used to declare the cells.

A cell must be a group of base stations with adjacent coverage. The maximum number of base stations per cell is 8 (you are advised to configure only 6, with a view to expansion in order to increase traffic flow). It may be necessary to declare several cells. The "Registration zone" is always 0. In multisite configurations, if the coverage areas overlap, you are advised to select different cell numbers for each of the sites.

```
                    CORDLESS TOPOLOGY

Object=Cells                                    Action=Display
------------------------------------------------------------------------------

Type of cell=DECT                               Cell=3..

------------------------------------------------------------------------------
Registration zone   --->  =0.

Operation performed
```

10.8 Declare the DECT parameters

Declare the DECT parameters in the MMC XLIGAB, object "radio zones" sub-object "DECT parameters".

The SARI number is the same as the PARI number. The PARI number is unique.

```
                      TELEPHONE SUBSCRIBERS

Objet=Radio Restrictions Radio   Topic=DECT Parameters      Action=Display
------------------------------------------------------------------------------

  PARI 1=0268652584
  PARI 2=..........
  PARI 3=..........
  PARI 4=..........
      RS=0000001515
  Rand f=0000001789

  synchronization delay Bit P0=1..

  LLP Radst prefix=999.

  Company profil.   SARI          Company profil.           SARI
  ---------------   ----------    ---------------           ----------
       =0          =0268652584              =.            =..........
       =.           =..........               =.             =......
```

- RS and Rand F: maximum 9 digits.

  2 random values (must not be the same) registered in the mobile by the PBX when the mobile was registered on the DECT network. From this point onwards, the PBX regularly checks the values registered in the mobiles (the values are calculated from these two parameters) in order to authorise or refuse use of the DECT network.

  Enter a value lower than 4294967295 (FFFF FFFFh). The value of the random number has no significance. However, in a multi-site configuration the number must be identical in all locations where the mobiles are to be registered.

- LLP Radst prefix: 4 digits maximum, 999 is the default.

  The base stations are connected to the PBX via an S0 Basic Rate Interface. One PLL (D channel) is used for signalling and downloading to the base stations. PLL directory numbers are comprised of digits recorded in this parameter followed by the base station declaration order number.

  Example: 999000, 999001, 999002, etc.

10.9 Trunk group/cell association

Use the MMC XBORFA, Object "Radstions Tk gp", to associate a company profile and a trunk group number with a cell number. This trunk group represents the resources in the cell and is used to associate the cell number with a physical equipment interface.

```
                      TRUNK GROUP AND TRUNKS

Object=Radstions Tkgp                          Action=Display

------------------------------ TRUNK GROUP ACCESS --------------------------
         CCU=3.                                Trunk Gp=0.
------------------------------ CHARACTERISTICS -----------------------------

Cell=0..

Authorized company profiles  ---->  =0.  =..  =..  =..  =..  =..  =..  =..
                                     =..  =..  =..  =..  =..  =..  =..  =..
Operation performed
```

10.10 Declare the base stations

The MMC XBORFA, Object "RadSta", is used to declare the base stations.

- The fields "TS Frame assignment" and "Freq. assignment" must not be changed (both at 1).
- The field "Anten. choice" must be "Automatic" if the base station has no external antenna.
- The field "Inscript. Radio Stat." must be at "yes" when the system starts up. It must be set to "no" if there are no mobiles to be registered.
- The field "Type of RadSt" must be set to BIT_M if you are working with 2 pairs (one transmit pair and one receive pair).
- A base station must be declared 4-channel.

```
                    TRUNK GROUP AND TRUNKS

Obj.=RadSta                                      Action=Display
                                                  RadStations Access mode=BOARD
------------------------------ RADIO STATIONS ACCESS --------------------------
CCU=3.           Board type=LDS          Number=2          Acces.=1.
------------------------------ CHARACTERISTICS --------------------------
Radst=4-chan        Radio station no=0.     Ident. RadSt =14
Trunk Gp=0.         Access status=IN SERVICE                 Bus=short

TS Frame assignment=111111111111           Freq. assignment=1111111111
                    11--------->0                              9------->0
Anten. choice= Automatic                Inscript. Radio Stat.=YES
Type of RadSt= BIT_M                        Distance master RadSt=0 to 100m
```

- You can check that the base stations have been put in service via the MMC XBORFA, object "RadSta", action "Display", RadStations Access mode "Trunk Grp".

```
TRUNK GROUP AND TRUNKS

Obj.=RadSta                                      Action=Display
                                                  RadStations Access mode=TRUNK GRP
------------------------------ TRUNK GROUP ACCESS -------------------------
         CCU=3.                                  Trunk Gp=0.
------------------------------ LIST OF RADIO BASE STATIONS --------------------
-----
Board type=LDS
Nr=2. Access=1. Record=YES   TS frame=111111111111       Frequenc.=1111111111
Status=FREE     Type=External Anten. choice=Automatic   Dist.Mast.RS=0 to 100m
Bus=Short       Nr=0          Ident. RadSt =14      RadSt=LDS 2 chan.
Nr=.. Access=.. Record=NO   TS frame=000000000000       Frequenc.=0000000000
Status=---     Type=Slave Anten. choice=Automatic   Dist.Mast.RS=0 to 100m
Bus=Short       Nr=           Ident. RadSt =..      RadSt=???
Nr=.. Access=.. Record=NO   TS frame=000000000000       Frequenc.=0000000000
Status=---     Type=Slave Anten. choice=Automatic   Dist.Mast.RS=0 to 100m
Bus=Short        Nr=           Ident. RadSt =..     RadSt=???
Nr=.. Access=.. Record=NO   TS frame=000000000000       Frequenc.=0000000000
Status=---     Type=Slave Anten. choice=Automatic   Dist.Mast.RS=0 to 100m
Bus=Short        Nr=           Ident. RadSt =..     RadSt=???
Press RETURN to go to next page          Page No=1       Number of pages=1
------------------------- THE BALANCE OF RADIO STATIONS STATUS -----------------
----
Nbr. of RadStation=1..       Free=1..        Busy=0..       Out of serv.=0..
                           Loading=0..
```

10.11 Register a mobile password

The MMC XSYSTM is used to register a mobile password.

```
SYSTEM PARAMETERS                    (Ctrl H: Help)
Object=Password
Type of password=Cordless Registration       Action=Modify
-------------------------------------------------------------------------

          Password=........   Operation Password=........
```

10.12 Declare and register a mobile

See Chapter 2, Registering an M90x mobile terminal.

10.13 Declare the DECT subscribers

Use the MMC XLIGAB, object "Telephone subscribers", to declare the Telephone subscribers.

All the mobiles must declared with cell 0 as the reference cell.

```
                      TELEPHONE SUBSCRIBERS

Object=Telephone Subscriber                          Action=Display
-------------------------------------------------------------------------Page=1-
-----------------------------SUBSCRIBER IDENTITY-------------------------
Input directory num=YES                        Subscriber num.=7780..
Site number=2..    Answ=NO                 Status=Free
CCU=2.       Card=..      Line=..
Subscriber type=Mono-user                   Company=0..      Depart.=0..
                                               Associated Exts.=NO
Extens-Type=DECT wireless                    Emergency Ext.=......
                                               Reference cell=0..
Message languages: Vocal =....     =........
Plans :  P_1 =NO =FT....  P_2 =NO =*        P_3 =NO =*       P_4 =NO =*
```

Chapter 11- Multi-site programming

11.1 Precautions to be taken in a multisite configuration

11.1.1 Contiguous multi-site configuration

For practical and operational reasons, it is essential to declare different cell numbers in the various sites (by allocating a range of numbers to each site). This is because in a multi-site configuration two neighbouring cells cannot have the same cell number and thus the same base station number.

The following MMCs must be implemented.

- Declare the same PARI on all the sites.
- Same RANDOM registration number on all the sites.
- Same RS registration number on all the sites.
- Same MOBILE registration password on all the sites.

Example MMCs for a contiguous multi-site configuration

Creating a three-site configuration with three cells each.

- Site1
  - Cell 00 associated with trunk group 0 Base stations 00 to 07
  - Cell 01 1 08 to 0F
  - Cell 02 2 10 to 17
- Site 2
  - Cell 10 associated with trunk group 0 Base stations 18 to 1F
  - Cell 11 1 20 to 27
  - Cell 12 2 28 to 2F
- Site 3
  - Cell 20 associated with trunk group 0 Base stations 30 to 37
  - Cell 21 1 38 to 3F
  - Cell 22 2 40 to 47

It is not necessary to give the trunk groups different numbers in the different sites: the trunk group represents the resources in the cell of each site.

11.1.2 Non-contiguous multi-site configuration

It is not necessary to give the different cells different numbers in the MMCs.

The following MMCs must be implemented:

- Declare the same PARI on all the sites.
- Same RANDOM registration number on all the sites.
- Same RS registration number on all the sites.
- Same MOBILE registration password on all the sites.

Broadcast of call setup requests must be configured to reach the sites with base stations

- on NeXspan 50: MMC XSERVI
  - sub-object "Radio zones", field "Zone= . ."
  - sub-object "General", field "Addr-nat."= F4, 2nd byte=BF (All sites of all centers)
- on NeXspan C/S/L: menu 1.8.1.2 or 1.9.1.2 "DECT Parameters"
  - parameter "search mobiles not registered"

Create a broadcast list A with all the sites where the DECT is present.

11.2 Declaring the radio zones on NeXspan 50 / NeXspan 500

MMC XSERVI

```
                    SERVICES MANAGEMENT
Obj.=Dept.                                      Action=Display
Sub-Object=GENERAL
---------------------------- SERVICE ACCESS --------------------------
Template CCU=2.
KEY: Address-nature = F4    2nd byte (comp_ovflw) = FE
---------------------------- SERVICE DATA ----------------------------
CCU selection mode = FIXED
Number of CCUs = 1
    Sites and Clusters in Hex from 0 to FEH
    1 : Site=BF     CCU = ..
    2 : Site=..     Cluster = ..
    3 : Site=..     Cluster = ..
    4 : Site=..     Cluster = ..
    5 : Site=..     Cluster = ..
    6 : Site=..     Cluster = ..
    7 : Site=..     Cluster = ..
    8 : Site=..     Cluster = ..
Subscr. number = ........
--------------------------------------------------------------------------
    Report=O.K.

Operation performed
```

11.3 Programming the DECT parameters

On NeXspan C/S/L, menu **1.8.1.2** (Single-company management) or **1.9.1.2** (Multi-company management) is used to program the DECT parameters:

```
DECT PARAMETERS
   PARI VALUE 0                      999999999.
   RANDOM VAL RECORDED             86........
   RS VAL RECORDED               66........
   DIR. BEGINNING ASSIGNED TO PLL      999.

   SEARCH MOBILES NOT REGISTERED
   IN THE LOCAL SITE                    NO
   OR IN ANOTHER SITE              ........
   OR IN THE LOCAL CENTER               NO
   OR IN ANOTHER CENTER             ........
   OR IN THE LIST                 BROADCAST A

   CLOCK SYNCHRON.              PRIORITY MASTER
   CURRENT STATE         TRANSMITTER NETWK CLK
```

The first four fields and the last two are described in the section DECT parameters to the page 164. The following parameters are specific to a multisite configuration and are used to define the list of sites on which the mobile terminals will be registered:

- SEARCH MOBILES NOT REGISTERED: fill in the field "OR IN THE LIST" with a broadcast list (broadcast list A is the default).

Program the menu **3.7.2.5** with a list of the remote sites and centres.

```
DEFINITION OF BROADCAST LIST A
    ITEM 1: CENTER NAME    01-CENTER 1
         OR SITE NAME              ........
         OR OTHER LIST              ........

    ITEM 2: CENTER NAME    02-CENTER 2
          OR SITE NAME              ........
          OR OTHER LIST              ........

    ITEM 3: CENTER NAME    03-CENTER 3
          OR SITE NAME              ........
          OR OTHER LIST              ........

    ITEM 4: CENTER NAME        ........
        SITE NAME             ........
          OR OTHER LIST              ........
```

11.4 Multi-site configuration with OCT4

In a multi-site configuration with OCT4 (or OCT4 I), one cabinet is declared "Reference Site": Menu **1.8.1.2** (Single-company management) or **1.9.1.2** (Multi-company management)

```
DECT PARAMETERS
     PARI VALUE 0                        999999999.
     RANDOM VAL RECORDED                 86........
     RS VAL RECORDED                     66........
     DIR. BEGINNING ASSIGNED TO PLL         999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                       NO
     OR IN ANOTHER SITE                  ........
     OR IN THE LOCAL CENTER                  NO
     OR IN ANOTHER CENTER                ........
     OR IN THE LIST                   BROADCAST A


     CLOCK SYNCHRON.                        MASTER

     CURRENT STATE        TRANSMITTER NETWK CLK
```

For the other sites the programming is as follows:

```
DECT PARAMETERS
     PARI VALUE 0                        999999999.
     RANDOM VAL RECORDED                 86........
     RS VAL RECORDED                     66........
     DIR. BEGINNING ASSIGNED TO PLL         999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                       NO
     OR IN ANOTHER SITE                  ........
     OR IN THE LOCAL CENTER                  NO
     OR IN ANOTHER CENTER                ........
     OR IN THE LIST                   BROADCAST A

     CLOCK SYNCHRON.                        SLAVE
     MASTER SITE FAR FROM             < 100 METERS
     CURRENT STATE                       RECEIVER
```

The line "MASTER SITE FAR FROM" is used to compensate the DECT clock transmission time from one site to another. Adjustment is made in 100 m steps on the slave PBXs, with the formula described in section Synchronization on M6501 L/R/RM IP PBX and Succession 6500 Media Gateway with OCT4/OCT4 I to the page 140. The minimum value for the "compensation" distance is "< 100 meters" and the maximum value "> 2000 meters".

The line "CURRENT STATE" gives the current state of DECT synchronization.
The possible states are: “transmitter”, “transmitter netwk clk”, “transmitter local clk”, “receiver”, “receiver not OK”, “receiver polarity OK”, and “receiver polarity not OK”. It is thus possible to know:

- whether the clock is taken from the network or the local clock,
- whether a slave site takes its synchronization from the master or if it has become transmitter due to a link problem with the master,
- whether the cable polarisation is correct.

11.5 Multi-site configuration with UCT-S/UCT-L/IUCT-D

In a multi-site configuration with UCT (UCT-S or UCT-L or IUCT-D), one PBX (Simplex mode) or two PBXs (Duplex mode) are declared "Master".

Note: *NeXspan C has no synchronization port but is capable of DECT multi-site synchronization via a third pair.*

11.5.1 Simplex mode

In Simplex mode, only one PBX is configured in "priority master" mode and provides the DECT synchronisation signal to the entire multi-sites network. Other PBXs are configured in "slave" mode.

Menu **1.8.1.2** (Single-company management) or **1.9.1.2** (Multi-company management): one site is declared priority Master.

```
DECT PARAMETERS
     PARI VALUE 0                      999999999.
     RANDOM VAL RECORDED             86........
     RS VAL RECORDED               66........
     DIR. BEGINNING ASSIGNED TO PLL      999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                   NO
     OR IN ANOTHER SITE              ........
     OR IN THE LOCAL CENTER              NO
     OR IN ANOTHER CENTER              ........
     OR IN THE LIST                 BROADCAST A


     CLOCK SYNCHRON.             PRIORITY MASTER
     CURRENT STATE              TRANSMITTER NETWK CLK
```

Note: *The line "CURRENT STATE" gives the current state of DECT synchronization.*
The possible states are: “transmitter”, “transmitter netwk clk”, “transmitter local clk”, “receiver”, “receiver not OK”, “receiver polarity OK”, and “receiver polarity not OK”. It is thus possible to know:
- whether the clock is taken from the network or the local clock,
- whether a slave site takes its synchronization from the master or if it has become transmitter due to a link problem with the master,
- whether the cable polarisation is correct.

For the other sites the programming is as follows:

```
DECT PARAMETERS
     PARI VALUE 0                      999999999.
     RANDOM VAL RECORDED             86........
     RS VAL RECORDED               66........
     DIR. BEGINNING ASSIGNED TO PLL      999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                     NO
     OR IN ANOTHER SITE              ........
     OR IN THE LOCAL CENTER                NO
     OR IN ANOTHER CENTER              ........
     OR IN THE LIST                 BROADCAST A

     CLOCK SYNCHRON.                 SLAVE
     MASTER SITE FAR FROM          < 100 METERS
     CURRENT STATE                  RECEIVER
```

The field "MASTER SITE FAR FROM" is used to compensate the DECT clock transmission time from one site to another. Adjustment is made in 100 m steps on the slave PBXs, with the formula described in the section "synchronization with UCT-L/UCT-S" applied. The minimum value for the "compensation" distance is "< 100 meters" and the maximum value "> 2000 meters".

11.5.2 Duplex mode

In Duplex mode, there are two "master" PBXs (one PBX is configured in "priority master" and the other in "not priority master" mode) and they can provide the DECT synchronisation signal to the entire multi-sites network. Other PBXs are configured in "slave" mode.

Menu **1.8.1.2** (Single-company management) or **1.9.1.2** (Multi-company management): one site is declared priority Master

```
DECT PARAMETERS
     PARI VALUE 0                      999999999.
     RANDOM VAL RECORDED             86........
     RS VAL RECORDED               66........
     DIR. BEGINNING ASSIGNED TO PLL      999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                     NO
     OR IN ANOTHER SITE              ........
     OR IN THE LOCAL CENTER                NO
     OR IN ANOTHER CENTER             ........
     OR IN THE LIST                 BROADCAST A


     CLOCK SYNCHRON.             PRIORITY MASTER
     CURRENT STATE              TRANSMITTER NETWK CLK
```

Note: *The line "Current state" gives the current state of DECT synchronization.*
The possible states are: transmitter, transmitter netwk clk, transmitter local clk, receiver, receiver not OK, receiver polarity OK, and receiver polarity not OK.
It is thus possible to know:
- whether the clock is taken from the network or the local clock,
- whether a slave site takes its synchronization from the master or whether it has become transmitter due to a link problem with the master,
- whether the cable polarisation is correct.

Another site is declared not priority Master:

```
DECT PARAMETERS
     PARI VALUE 0                      999999999.
     RANDOM VAL RECORDED             86........
     RS VAL RECORDED               66........
     DIR. BEGINNING ASSIGNED TO PLL      999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                     NO
     OR IN ANOTHER SITE              ........
     OR IN THE LOCAL CENTER                NO
     OR IN ANOTHER CENTER             ........
     OR IN THE LIST                 BROADCAST A


     CLOCK SYNCHRON.             NOT PRIORITY MASTER
     CURRENT STATE                 RECEIVER
```

For the other sites the programming is as follows:

```
DECT PARAMETERS
     PARI VALUE 0                      999999999.
     RANDOM VAL RECORDED             86........
     RS VAL RECORDED               66........
     DIR. BEGINNING ASSIGNED TO PLL      999.

     SEARCH MOBILES NOT REGISTERED
     IN THE LOCAL SITE                     NO
     OR IN ANOTHER SITE              ........
     OR IN THE LOCAL CENTER                NO
     OR IN ANOTHER CENTER             ........
     OR IN THE LIST                 BROADCAST A

     CLOCK SYNCHRON.                 SLAVE
     MASTER SITE FAR FROM          < 100 METERS
     CURRENT STATE                 RECEIVER
```

The field "MASTER SITE FAR FROM" is used to compensate the DECT clock transmission time from one site to another. Adjustment is made in 100 m steps on the slave PBXs, with the formula described in the section "synchronization with UCT-L/UCT-S" applied. The minimum value for the "adjustment" distance is "<100 meters", and the maximum value "> 2000 meters".

11.6 Multi-site configuration with CSI

In a multi-site configuration with CSI there is no particular MMC programming to be carried out. Configuration is manual (configuration of switches on BCSI, CSI and RMH; see section 7.5.2).