

MiVoice MX-ONE

Cordless phone -

DESCRIPTION

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GENERAL

DESCRIPTION

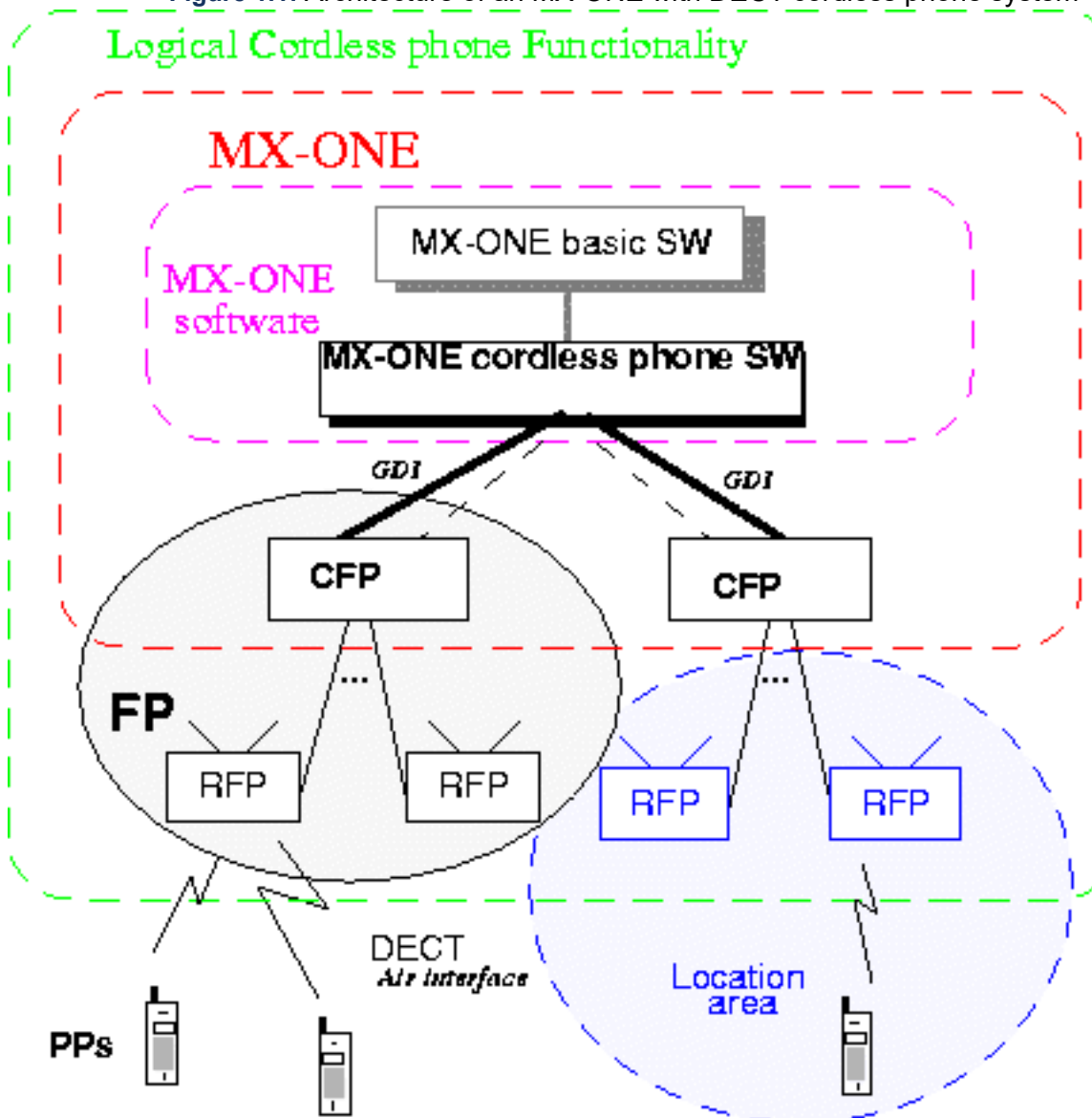
This document describes the integrated DECT.

The cordless phone feature enables users to make and accept calls at any location in the coverage area of its base stations. The feature is fully compliant to the DECT GAP/CAP standards, which ensures desk phone speech quality and full security from wiretapping.

The cordless phone feature in MX-ONE consists of a number of software units, a specific hardware unit (ELU31), external Radio Fixed Parts (RFPs), and Portable Parts (PPs). Cordless extension is a fully integrated extension type in MX-ONE, and can use most of the features available in the system.

In order to secure cordless phone functionality, the MX-ONE system must be synchronized to a reference timing source. For more information see Cordless Phone Installation Instructions.

Synchronization between all ELU31 boards in the system is handled via a ring cable structure. This to get the Air frame synchronization correct. For more information see Cordless Phone Installation Instructions.

Figure 1.1: Architecture of an MX-ONE with DECT cordless phone system

From the MX-ONE point of view, the interface to the cordless extension has two meanings:

- The MX-ONE has an internal communication link using the Generic DECT Interface (GDI) to a Common Fixed Part (CFP), which in turn has a physically wired interface using a proprietary protocol to external RFPs.
- The PP is carried around, and has radio connection using a DECT air interface to one of the RFPs. The air interface supports both GAP and CAP standards (DECT standard subsets).

FACILITIES

BASIC TRAFFIC

Cordless extensions handle incoming and outgoing calls. For incoming and outgoing calls bearer service Speech is supported.

The voice and signaling channels over the air interface are encrypted, this prevents other radio equipment to listen in on the conversation or to tap data.

Before a PP can make an outgoing call or receive an incoming call, location registration procedure has to be executed.

PPs that are out of radio range, switched off, or not located, are marked as unavailable in the MX-ONE. A tone or a recorded announcement message is received at call to a cordless extension that is marked as unavailable.

LOCATION PROCEDURES

LOCATION REGISTRATION

Location Registration is defined as the process whereby the position of a PP is determined to the level of one location area, and this position is updated in one or more data bases.

The location procedures make it possible for users to move between different location areas in the same MX-ONE-system and still be reached by the MX-ONE.

The location information for a PP is updated in the MX-ONE each time it enters a new location area. The location registration procedure is initiated by the PP when it senses that the signal from an RFP in another location area is stronger than the one it is currently registered in.

Location registration during LIM outage see *MiVoice MX-ONE Home Location Register Redundancy - Description*.

Using the `dect_system_id` command, the duration time can be defined. Time = 0 means the feature is inactive for all terminals regardless of terminal activation status. Feature activation for each terminal is done using the `dect_extension` command.

For a terminal for which the feature is active, re-registration time is set with Duration IE in message locate accept. The terminal will then renew the registration within that time, regardless of whether it is needed or not due to signal strength or other conditions.

NOTE: Terminal must have correct FW to support this feature. Terminals 5613 and 5614 with firmware 2.15.1 or later support the Duration feature.

This feature will improve the HLR redundancy function.

NOTE: The short time increases the load on the system.

DETACH

Detach is a procedure initiated when the PP is switched off. The PP is then marked as unavailable in the MX-ONE. Users that call a cordless extension that has initiated detach, receive a tone message indicating that it is unavailable.

Detach during LIM outage see *MiVoice MX-ONE Home Location Register Redundancy - Description*.

HAND OVER

Hand over is the process of switching a call during ringing/alerting or in speech from one physical channel to another physical channel.

The new channel may be within the same RFP or in another RFP. In the latter case the new RFP may be within the same ELU31 board or in a new ELU31 board. In the

MX-ONE environment, calls can be handed over between FPs located in different LIMs within the same MX-ONE node.

Note that hand over during alerting, when the terminating party moves to another location area, is only possible for basic call. If there is a service interaction when the terminating party starts to move to another location area then the hand over request will be rejected and the call will be dropped when the portable moves out of range of the ELU31 board.

Hand over during LIM outage see *MiVoice MX-ONE Home Location Register Redundancy - Description*.

SECURITY PROCEDURES

Delivered SARI value must be used.

The Security procedures consist of the Access-Rights, Authentication and Ciphering procedures.

ACCESS-RIGHTS

Every RFP broadcasts for its purpose a unique identity which contains a globally unique Access Rights Identity (ARI). Every PP has both a Portable Access Rights Key (PARK) and an International Portable User Identity (IPUI). A PP is allowed to access any RFP which broadcasts an ARI that can be identified by any of the PARKs of that PP.

The Access Rights procedure supplies the PP with an Identity (IPUI) and an Access Rights Key (PARK), and thereby access rights to the MX-ONE. This procedure is the on-air-subscription for the PP and the last step of the initiation of a PP. The Access Rights procedure is done before the Location Registration procedure and is required before any calls can be made to/from the PP.

AUTHENTICATION

The purpose of the Authentication procedure is to verify the identity of the PP and/or FP. This procedure is always invoked in connection with the Location Registration procedure.

Authentication of PP

Threats, like using another DECT user identity to avoid call charges or for anonymity reasons, or using stolen or non-type-approved handsets, may be prevented by authentication of PP.

Authentication of FP (MX-ONE)

Authentication of FP is provided to prevent impersonation of an RFP. When an RFP is impersonated, user data may more easily be revealed and calls may be handled in any way. PP may at any time request authentication of FP.

CIPHERING

The ciphering procedure is used to handle the ciphering of the information sent over the air. The voice and signaling channels over the air interface can be encrypted.

MX-ONE supports ciphering and it is always active.

FEATURES

The cordless extensions have access to most of the services and features that are offered to other extension types in the MX-ONE. The services are supported according to DECT standards (CAP/GAP. Below follows a list of the most important features available for the cordless extensions. In addition the PPs can have implemented terminal-specific features. For more information about supported features see description MIVoice MX-ONE FEATURE MATRIX.

Support system feature Mobility logging can be used to verify the site survey.

NOTE: Using Mobility Logging with reporting of connection hand over causes extra load on the ELU31 boards. Use only when that type of data is required.

MGU has a feature to block all ELU 31/4 boards when the connection to the service node (LIM) is lost. A service node needs 30-90 seconds to detect a fault situation; that is, for CTLP to know that contact with ELU31 is lost. MGU block time must be more than the service node block time. CTLP will de-block ELU31/4 boards after service returns to normal. This MGU feature can be activated using the commands `media_gateway_info -set ELU31 -mgw 1a -name ELU31 -attrib EnableBlocking -bool true` with the recommended time `media_gateway_info -set ELU31-mgw 1a -name ELU31 -attrib BlockTimeout -int 100`. If for some reason, the service node takes more time to come up than the block time MGU implements, ELU31 signals will be blocked on the air interface but will not be marked as blocked in the service node. The service node (LIM) must be de-blocked using command `blocking`.

Using the `dect_system_id` command, the duration time can be defined. Time = 0 means the feature is inactive for all terminals regardless of terminal activation status. Feature activation for each terminal is done using the `dect_extension` command.

For a terminal for which the feature is active, re-registration time is set with Duration IE in message locate accept. The terminal will then renew the registration within that time, regardless of whether it is needed or not due to signal strength or other conditions.

NOTE: Terminal must have correct FW to support this feature. Terminals 5613 and 5614 with firmware 2.15.1 or later support the Duration feature.

This feature will improve the HLR redundancy function.

NOTE: The short time increases the load on the system.

ALARM HANDLING

The following alarm codes can be received from the ELU31 board. These alarms may affect the traffic for cordless extensions:

- | | |
|-----|---|
| 12 | Failed Registration of Third Party DECT Device due to Third Party License.
Try to register third party DECT device without third party license, this alarm will be raised. |
| 347 | Synchronization fault for DECT fixed part
The alarm indicates that a fault is detected on the synchronization between two ELU31 boards. |
| 348 | Synchronization disturbance for DECT fixed part.
The alarm indicates that a disturbance is detected on the synchronization between two ELU31 boards. |
| 349 | Faulty RFP for DECT fixed part.
The alarm indicates faulty Radio Fixed Part (RFP). |

For more information on action to be made see FAULT CODES 1/15451-ANF90114.

CAPACITIES AND LIMITATIONS

For capacities see the description for *CAPACITY DESCRIPTION FOR MIVOICE MX-ONE - TELEPHONY SWITCH*.

At service node (LIM) outage can connected MGW still have power. If ELU31 have power, will its base stations transmit. CXN connected to these base stations will not have any service. Call to and from CXN is not possible including location registration in the same LIM. CXN need to perform a location registration to a location area that have service, where base stations are connected to another LIM. To prevent this, see chapter [FEATURES](#).

HARDWARE

ADDITIONAL EQUIPMENT

The ELU31 board, RFPs and PPs are additional hardware that are needed to initiate the cordless phone feature within the MX-ONE.

The ELU31 board contains the radio control system and interfaces for up to eight RFPs, for one DECT fixed part.

All media gateways with ELU31 boards must be synchronized to one reference timing source, PCM synchronization source.

This timing source could be E1/T1 or the clock source on MGU. ELU31 ring master board will distribute this PCM timing through synchronization ring. For more information see Cordless Phone Installation Instructions.

Synchronization between all ELU31 boards in the system are handled via a ring cable structure. This to get the DECT Air frame synchronization correct.

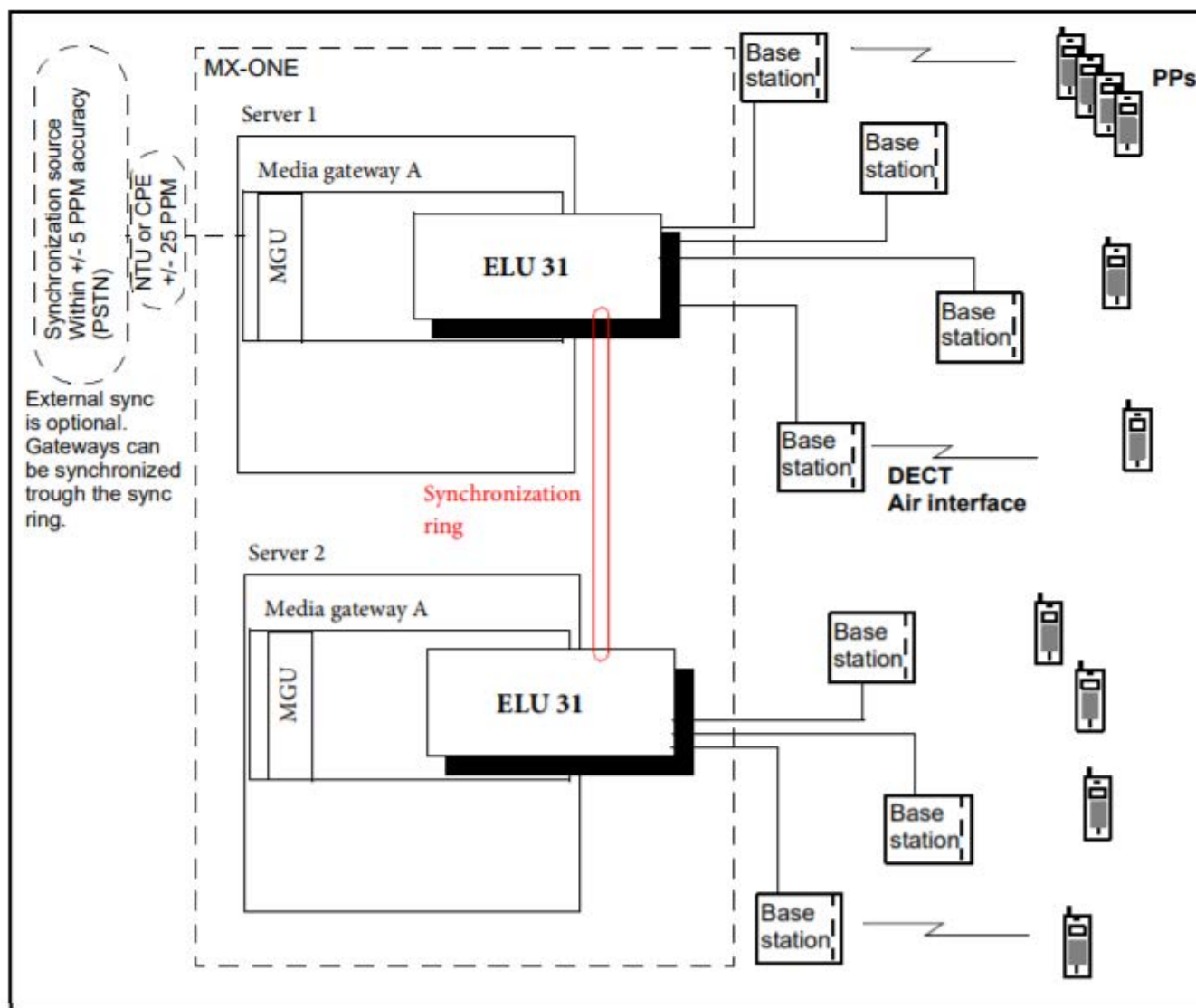
Only one ELU31 board (RING MEMBER / RING MASTER) in a subrack can be connected to the ring, the other ELU31 boards (BUS SLAVES) in the same subrack receive synchronization signals through a back-plane bus.

The length of the synchronization cable between two ELU31 boards, that are connected to the ring structure, cannot exceed 1300 metres/4300 feet. Actual length that can be used is depending on type of cable for more information see installation instruction CORDLESS PHONE.

There is no theoretical limit to the number of ring segments per system. However it is recommended that if the total cable length for one synchronization ring is more than 3 km or if the sum of cable delays for one synchronization ring is more than 20 microseconds a careful verification of the synchronization stability is strongly recommended using the diagnostic_print commands for CTLP.

HARDWARE ARCHITECTURE

Figure 2 Configuration of a DECT system in a single MX-ONE node. on page 10 illustrates the HW components comprising the integrated DECT architecture.

Figure 3.1: Configuration of a DECT system in a single MX-ONE node.

NOTE: For more information about synchronization see Cordless Phone Installation Instruction.

