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1. The Diagnostic handset – The professional diagnostic tool for fault finding and deployment of DECT systems

Finding and correcting faults in a business DECT system is a demanding task. In order to make sure that you get to the real problem, you have to be able to see and control the interference that will exist in a radio system transmitting in low-power mode. The Diagnostic handset contains various features which simplify fault finding in existing DECT solutions and the system is adjusted with an accuracy, that makes it a highly recommendable tool for setting up new DECT installations.

During normal operation, it takes approximately 3 1/2 hours to charge the handset from fully discharged to its full capacity. Place the handset in the charger. When the handset is turned on, the display shows the charging status in line 3. For correct charging be sure the room temperature is between 0°C and 25°C. Do not place the handset in direct sunlight. The battery has a built-in heat sensor which will stop charging if the battery temperature is too high.

It is necessary to recharge the battery when the display shows "BATTERY LOW", or if it can not be turned on. The LED flashes at a low frequency while charging and lights constantly when the charging is finished. The display goes back to normal mode when fully charged.
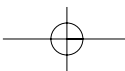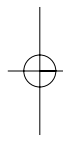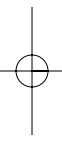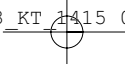
When the handset is placed in the charger it will not vibrate, and B-answer is inactive. If the battery is fully discharged, up to 10 min. may pass before charging begins and the handset can be turned on. When the charger begins the charging, status is shown in the 3rd line of the display and the LED flashes slowly.

3. Deployment

The difficult part of installing a DECT system is the question of where to place the base stations. The placement of the base stations is made during deployment of the site. Deployment should only be performed be trained technicians.

4. Subscription of the Handset

Follow the instruction of your DECT system.

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                  ┌──────────┐
                  │          │
                  │          │
                  └────┬─────┘
                       │
                       ▼
    ┌──────────┐    ┌──────────┐    ┌──────────┐
    │  MENU    │───▶│  MENU    │───▶│  MENU    │
    │BEST BASES│    │ CUR. BASE│    │ FREE CHA │
    │ ◀      ▶ │    │ ◀      ▶ │    │ ◀        │
    └────┬─────┘    └──────────┘    └──────────┘
         │
         ▼
    ┌──────────┐                    ┌──────────┐
    │ENTER RFPI│                    │          │
    │/MASK: XXXX│                   │ SCANNIN  │
    │XXXXXX-YY │                    │          │
    │ ◀      ▶ │                    └──────────┘
    └────┬─────┘
         │
         ▼
    ┌──────────┐
    │ SCANNING │
    │          │
    └────┬─────┘
         │
         ▼
    ┌──────────┐    ┌──────────┐    ┌──────────┐
    │XXXXXXXXXX│───▶│XXXXXXXXXX│───▶│ < -90 dB │
    │  YY/ZZ   │    │ F S Q R  │    │  NXXX    │
    │ -QQ dBm  │    │Y YY YY YY│    │          │
    │ ◀      ▶ │    │ ◀      ▶ │    │ ◀        │
    └──────────┘    └──────────┘    └──────────┘
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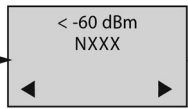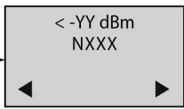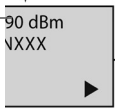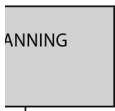
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MENU
E CHAN:
▶ → **STANDARD MENU**

ANNING

| 90 dBm NXXX ▶ | → | < -YY dBm NXXX ◀ ▶ | → | < -60 dBm NXXX ◀ ▶ |
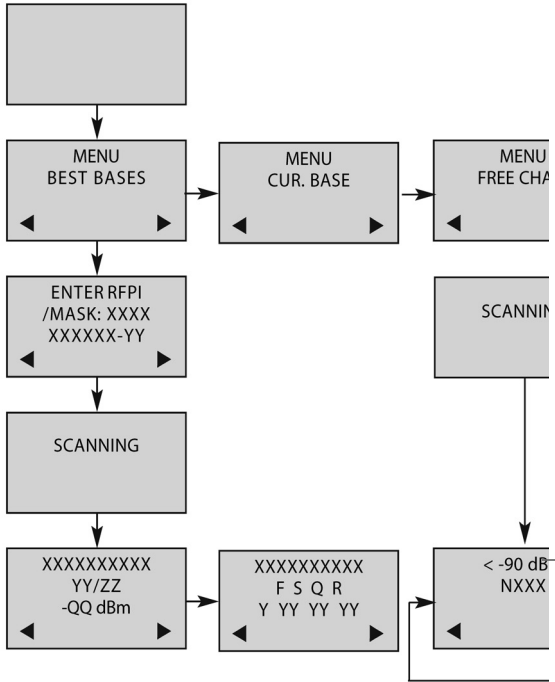
5.1. Best Base Stations

In the "BEST BASES" menu it is possible to see how many base stations there are in the air where the handset is placed. The base stations are sorted after signal strength (RSSI).

In the RFPI/MASK menu the RFPI number is selected. The RFPI number is a combination of the ARI and the RPN (base number) in hex.

The handset can save information for 25 base stations.

ARI

The ARI number is a unique number for each DECT system. There are 5 different classes: A, B, C, D, and E.(ETS 300 175-6)

Class A is for Home DECT:

	ARI A		
ARC	ARD		
A	EMC	FPN	
3	16	17	= 36 bits

	RFPI A			
E	PARI			RPN
Y/N	A	EMC	FPN	RPN
1	3	16	17	3	= 40 bits

Class B is for Business DECT:

	ARI B		
ARC	ARD		
B	EIC	FPN	FPS
3	16	8	4	= 31 bits

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RFPI B

E	PARI				RPN
Y/N	B	EIC	FPN	FPS	RPN
1	3	16	8	4	8

= 40 bits

Class C is for DECT local loop:

ARI C

ARC	ARD		
C	POC	FPN	FPS
3	16	8	4

= 31 bits

RFPI C

E	PARI				RPN
Y/N	C	POC	FPN	FPS	RPN
1	3	16	8	4	8

= 40 bits

Class D is for DECT directly attached to GSM:

ARI D

ARC	ARD	
D	GOP	FPN
3	20	8

= 31 bits

RFPI D

E	PARI			NO
Y/N	D	GOP	FPN	RPN
1	3	20	8	8

= 40 bits

Class E is for PP to PP direct communication:

ARI E

ARC	ARD	
E	FIL	FPN
3	16	12

= 31 bits

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RFPI E			
E	PARI		NO
Y/N	E	FIL	FPN	RPN
1	3	16	12	8	= 40 bits

EMC: Equipment Manufacturer's Code
FPN: Fixed Part Number
RPN: Radio Fixed Part Number (Base number)
EIC: Equipment Installer's Code
FPS: Fixed Part Sub Number
POC: Public Operator Code
GOP: GSM Operator Code
FIL: Fill bits fixed 16-bit 0101... pattern

The ARI Number of a DECT System

The ARI number of a residential system characterised by the octal number starting with 0.
• Divide the octal number by 2.

The ARI number of a business system is characterised by the octal number starting with 0.
• Divide the octal number by 4.
  The reason to this is because of an ARI- Bs 31 bits have to be converted into a 10 digit hex number (ETSI 300 175-6).
• After the division a convert into a hex number is maked.

i.e.

10002001630o ⇒ 100200E6h

To be able to write the hex values A B C D E F you have to press the keys 1 2 3 4 5 6 down respectively. The keys will toggle between the value every 1.5 seconds.

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Base Number (RPN)
The RPN value can be read in the handset and can be in decimal or hex value.
The hex value is read in the test mode
* 99989 *, and the decimal value is in the test mode * 99981 *.
MASK
MASK is shown in decimal and tells how many bits the handset has to consider in the RFPI number.

i.e.

RFPI = 100200E606h $\Rightarrow$

0001 0000 0000 0010 0000 0000 1110 0110
                        ARI

0000 0110
    RFP

If the MASK value is 00 the handset will look for all base stations in all the DECT systems in the area.

If the MASK value is 32 it is only the ARI number, which will be taken into consideration, and the handset will look for all base stations in the system.

If the MASK value is 40 the handset will look for only one base station in one system.

When the RFPI/MASK value is entered the handset will scan for base stations each time the handset finds a new base stations. When a base station changes place in the index, a tone is generated. The base stations are sorted after the power in the index. It is possible to change between the base stations with the arrows (Please refer to the menu structure).

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XXXXXXXXXX: RFPI number.
YY: Index (1 - 25).
ZZ: Number of bases found
             (1 - 25).
QQ: RSSI value (-99 - 00).
To select a base station press ENTER
and the handset will stay on this base
stations until the handset is powered off
or a LOGIN is made. The display is now
the same as if CUR BASE (Ch. 5.2) was
selected.

5.2 Cur. Base
"Cur Base" makes it possible to see the
status of the base station the handset is
presently locked onto (Se MENU Structu-
re)

XXXXXXXXXX: RFPI number.
F: The frequency the hand-
             set is presently using
             (0-9).
S: The timeslot the hand-
             set is presently using
             (0-11).
Q: Bit error measurement
             (0-64).
R: RSSI value (-99-00).

The GAP standard has 10 frequencies
from 1880 MHz. to 1900 MHz. in 1.7
MHz steps. For each frequency there are
12 slots. This means that there are 120
channels available.

The US DECT standard has 5 frequenci-
es from 1920 MHz to 1930 MHz. This
means that there are 60 channels
available.

When a handset is in idle mode (no
calls) the handset has a dummy bearer
connected to the base station. The dum-

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my bearer only uses one channel on the
base station RF-module if the dummy
bearer is jumping between the channels.
When a call is on the base station all
slots on the frequency are blocked. The
frequency on which the call is can also
change, but this only happens if the qua-
lity is getting very bad.

5.3 Free Chan.

With "Free Chan" it is possible to see
how many free DECT channels there are
on the spot on which the handset is
located. The channels are sorted after
the power. (Please refer to the Menu
Structure).

YY: Free channel level in steps of
      5 dBm from –90 dBm to –60 dBm
XXX: Number of free channels
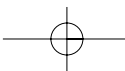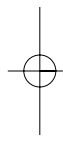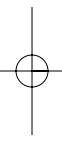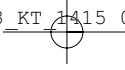
6. Possible use of the Handset

Deploying a New Site.

When installation has to be made in a
new site the placement of the base stati-
ons has to be located. The Deployment
handset can be used for this purpose.
Subscribe the handset to a deployment
base and find the radio coverage from
the base station. When the deployment is
completed the base stations can be put
up. It is possible to download an applica-
tion note about deployment from the
Internet.

Checking an Installed System

• It is possible to find the range of a base
  station in a multi cell system by logging
the handset to a base station.
• There may be some spots on the site
  that may cause problems, the so-called
"Hot Spots". It is possible to locate the-
  se spots because the handset registers
  4 base stations.

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Note:

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