Documentation

HiPath 4000 V5
IP Solutions - Routing of Emergencey Calls

Service Documentation

A31003-H3150-S104-1-7620

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Service Manual HiPath 4000 V5 - IP Solutions - Emergency call routing from HFA stations with emergency number in IPDA environments - Contents

1 Introduction

1.1 Problem Description

VoIP stations encounter fundamental problems with emergency calls in fixed networks. Essentially, emergency call routing in fixed networks operates by automatically routing the emergency number to the nearest control center using calling line information from the relevant station PEN.

However, VoIP stations, such as, optiClient 130, are mobile (mobile HFA feature), while their gateways to the central office are stationary. The PBX is unable to determine the location of the VoIP station and consequently, is unable to perform automatic intervention. LCR is currently used to resolve the emergency call problem.

In general, the user knows and dials the emergency number (0-112, for instance). This number now has to be routed to the control center nearest the user's current location. This involves considering - and where necessary, modifying - site-specific calling line information (CLI).

What happens in practice if the emergency call reaches the wrong control center on account of incorrect location information?

Scenario 1: The location of the injured party cannot be pinpointed straightaway in off-hook intercept calls (the calling party is no longer capable of specifying his or her location).

Scenario 2: The chance of accurate positioning is very high if the calling party can provide accurate information about his or her location. The calling party is not forwarded directly to the relevant control center, however. Instead, the control center operator logs the calling party's details and reports the emergency to relevant control center. Transmission errors can naturally occur during this operation.

This document describes emergency calls in both HFA and, for the sake of completeness, IPDA environments.

1.2 Theoretical routing for emergency calls in fixed networks

In Germany, the basic requirements for emergency calls are stipulated in the Telecommunications Law of June 25, 2004. Draft versions of emergency call ordinances also exist, although these have yet to be finalized.

Essentially, there are two requirements that carriers must satisfy:

- The emergency call option must be available free of charge to all users by dialing the standardized emergency number for Europe (112) or any other national numbers configured (110, 19222).
- Emergency calls must be forwarded to the local emergency answering station (control center) in charge, along with the calling party's station number and information on the location.

The following example uses the German 112 emergency number to illustrate the emergency call technique:

The emergency call is dispatched from an analog or fixed-network connection by dialing 112. Let's assume that the station number of the telephone where the emergency call was dialed in this example is 0511- 4711. The station switching exchange responsible for the local network spots the 112 number straightaway and knows that it represents an emergency call. It then evaluates the calling line information (CLI) and routes the call to the emergency answering station closest to the caller (in this case, in Hanover on account of the prefix 0511). A city of Hanover's size typically has many different control centers. However, because the carrier knows the exact position of the connection, it can select and address the control center nearest to the calling party.

The alerting party's station number is displayed in the control center. If the precise location is unclear, the control center operator can look up the number in the telephone directory or request more information from the carrier or the German Federal Network Agency.

In other words, users cannot decide which control center they would like to reach when they dial 112 (or 110). The control center is automatically assigned on the basis of the caller's station number.

Some emergency numbers can be dialed with a prefix. One such number is 19222. Emergency calls dialed using these numbers are processed at state level. Regional differences may apply. Germany has a total of over 300 control centers. For a list of the station numbers for these control centers, go to *http://www.schwerhoerigen-netz.de/MAIN/notrufe.asp?page=BLAENDER/01* When using these numbers, the user is personally responsible for selecting the nearest control center.

In Europe, the European Commission has issued EU recommendations that are also reflected in national law. The German version largely corresponds to the European solution. The main difference between the EU solution and the German solution is that in the EU solution, 112 is routed in the PSTN to an emergency answering station ("PSAP"). There, a team of operators uses the CLI (and any other information available) to choose where to route the call, that is, to which control center and service provider (fire department, police, etc.).

In the USA, a standalone 911 network exists for emergency calls. This, however, will not be discussed further here.

Future enhancements to the emergency call architecture are called E112 (E=enhanced).

In conclusion, the key elements of this section are as follows:

- In Germany, the emergency call can be linked to 112 or 110 without a prefix.
- Some German states accept emergency calls dialed with 19222 and a prefix.
- When 112 or 110 is dialed as the emergency number, the control center to which a call is routed is selected on the basis of the calling party's local area code. If a user with the station number 0511-4711 dials 112 or 110, he or she is always routed to the control center that is responsible for Hanover. This also applies if 0511-4711 is the station number of a VoIP client currently in use at Munich airport.

2 Examples

2.1 HFA telephone with emergency number at a HiPath 4000 host system without IPDA

Emergency calls only work in analog or ISDN systems if the station's CLI matches the station's location. The same is not true for IP stations. Given that HFA stations can visit any location, an emergency number was introduced for emergency calls for HFA stations.

The sole purpose of the following example is to illustrate how the emergency number works. The emergency call would be correctly processed in this case even without the emergency number.

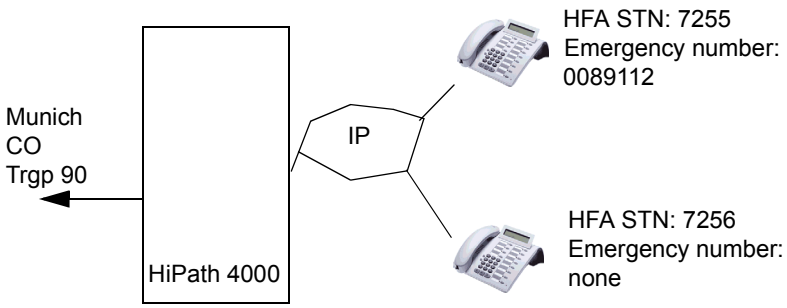


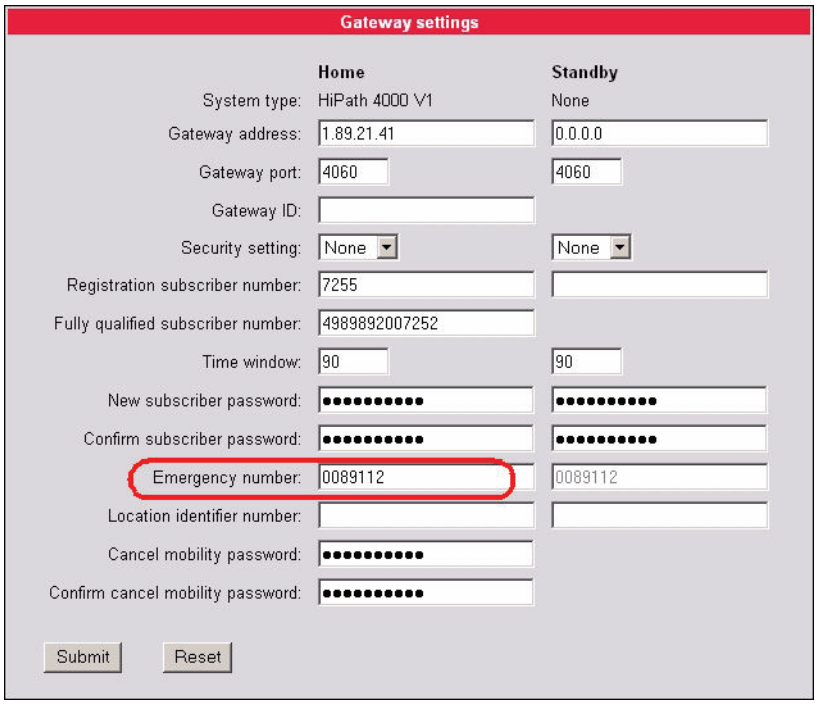
Figure 1 *HiPath 4000 system with two HFA stations. Station 7255 should use the emergency number to make emergency calls - station 7256 should not.*

The diagram shows two HFA stations (with station numbers 7255 and 7256) connected to a HiPath 4000 system in Munich.

The WBM application can now be used to set an emergency number (in this case, 0089112) for the telephone associated with station 7255.

Examples

HFA telephone with emergency number at a HiPath 4000 host system without IPDA



Click "Submit" to send this number to the HiPath 4000 where it can be displayed with:

```
DIS-SBCSU:7255,OPTIDAT;
```

```
ABFRAGEN-SBCSU:TLNNU=7255,TYP=OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN ---------------OPTIIP  -----7255-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                    |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT420 ADVANCE/4LD           |  0  | 4A 10 47 8E | 5.1.7   |   0  |
| OPTIPOINT420 KEY MODULE 1          |     |             | SK01.03 |   0  |
| OPTIPOINT420 CONTROL ADAPTER 1     |     |             | 0000000 |   0  |
+------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ------------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4           |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL      |
|                  SLKKONT  : 2                                             |
+---------------------------------------------------------------------------+
+-------------- IP SETTINGS ------------------------------------------------+
| IPADR    : 001.089.021.096       EMERG NO : 0089112                       |
| SW-CAPAB : MOBHFA    DMC_V1           LIN :                               |
+---------------------------------------------------------------------------+

AMO-SBCSU-111       ENDGERAETE- UND S0-BUS-KONFIGURATION IN SWU
ABFRAGEN DURCHGEFUEHRT;
```

An emergency number should not be set for station 7256. An emergency number is not displayed for this station in the SBCSU.

```
ABFRAGEN-SBCSU:TLNNU=7256,TYP=OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN ---------------OPTIIP  -----7256-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID-------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                     |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT410 ADVANCE/4LD            |  0  | 4A 50 57 DE | 5.1.13  |   0  |
| OPTIPOINT410 KEY MODULE 1           |     |             | KM01.01 |   0  |
| OPTIPOINT410 CONTROL ADAPTER 1      |     |             | 0000000 |   0  |
+-------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ------------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4          |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL     |
|                  SLKKONT  : 2                                             |
+---------------------------------------------------------------------------+
+-------------- IP SETTINGS ------------------------------------------------+
| IPADR    : 001.089.021.095       EMERG NO :                               |
| SW-CAPAB : MOBHFA    DMC_V1          LIN :                               |
+---------------------------------------------------------------------------+

AMO-SBCSU-111       ENDGERAETE- UND S0-BUS-KONFIGURATION IN SWU
ABFRAGEN DURCHGEFUEHRT;
```

If the user at HFA station 7255 or 7256 dials 0-112 now, the AMOs LDPLN and LDAT can be used to assign an AMO RICHT with the parameter EMCYRTT=YES to the relevant station.

```
ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="0"-"W"-
"112",LROUTE=191,LAUTH=1&2&51;
```

```
ADD-LODR:ODR=91,CMD=ECHO,FIELD=3;
ADD-LODR:ODR=91,CMD=NPI,NPI=ISDN,TON=SUBSCR;
ADD-LODR:ODR=91,CMD=END;
ADD-LODR:ODR=91,INFO="ICN CO ISDN LOCAL";
```

```
ADD-LDAT:LROUTE=191,LSVC=ALL,LVAL=1,TGRP=90,ORD=91,LAUTH=1&51;
```

```
ADD-RICHT:MODE=LRTENEW,LRTE=191,LSVC=ALL,NAME="CO EMERG",
TGRP=90,DNNO=1-89-299,EMCYRTT=YES,INFO="EMERG ISDN LOCAL",
PDNNO=10-89-299;
```

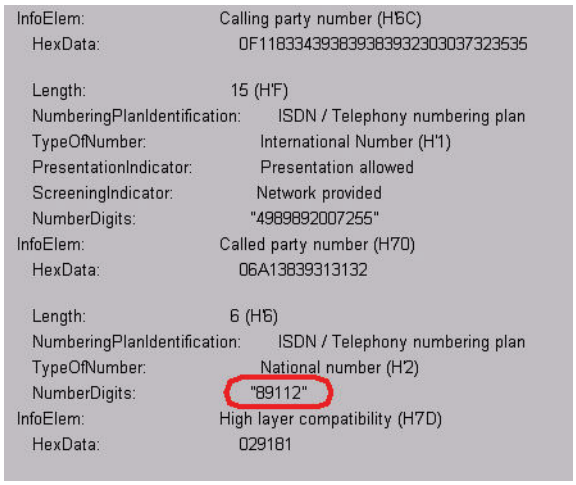
The procedure for station 7256 with no emergency number is perfectly normal: it routes 112 over trunk group 90 to the central office.

```
InfoElem:                Calling party number (H'6C)
  HexData:                 0F1183343938393839323030373235336

  Length:                15 (H'F)
  NumberingPlanIdentification:     ISDN / Telephony numbering plan
  TypeOfNumber:              International Number (H'1)
  PresentationIndicator:     Presentation allowed
  ScreeningIndicator:        Network provided
  NumberDigits:            "4989892007256"
InfoElem:                Called party number (H'70)
  HexData:                 04C1313132

  Length:                4 (H'4)
  NumberingPlanIdentification:     ISDN / Telephony numbering plan
  TypeOfNumber:              Subscriber number (H'4)
  NumberDigits:            "112"
InfoElem:                High layer compatibility (H'7D)
  HexData:                 029181
```

The parameter EMCYRTT=YES in the AMO RICHT, however, forces station 7255 to replace the station number dialed (0-112) with the emergency number.

Examples

HFA telephone with emergency number at a HiPath 4000 host system without IPDA



Emergency number 0089112 can now be reevaluated in LCR where it can be assigned to a different LRTE. However, as this LRTE is only used to break out into the CO, EMCYRTT=NO must be set in the AMO RICHT for the new LRTE. The entire configuration can be set up as follows:

```
ADD-RICHT:MODE=LRTENEW,LRTE=72,LSVC=ALL,NAME="EMERG 089112",
TGRP=90,DNNO=1-89-299,EMCYRTT=NO,INFO="EMERG MCH", PDNNO=10-89-
299;
```

In the following AMOs, ECHO 5 is only set in the outdial rule because "112" cannot be dialed with a prefix in the public network.

```
ADD-LODR:ODR=87,CMD=ECHO,FIELD=5;
ADD-LODR:ODR=87,CMD=NPI,NPI=ISDN,TON=SUBSCR;
ADD-LODR:ODR=87,CMD=END;
```

```
ADD-LODR:ODR=391,INFO="EMERG AP18";
```

```
ADD-LDAT:LROUTE=72,LSVC=ALL,LVAL=1,TGRP=90,ORD=87,LAUTH=1;
```

```
ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="0"-"W"-"0"-"89"-"112",
LROUTE=72,LAUTH=1;
```

There are two things to be considered here:

- As 112 cannot be combined with a local area code in the German public network, ECHO 5 (112) is only sent in the outdial rule (AMO LODR). This is completely correct because the system's CO access is located in Munich and the station's CLI references Munich.
- The LDPLN should never forward "joker" digit patterns (-X, -Z) to a route where EMCYRTT=YES is set as otherwise the station with the emergency number risks being routed to the control center by mistake when a normal number is dialed.

An emergency number can therefore be used to address any control center. This means that if HFA telephones in Berlin, for instance, are operated at this system, they should contain an emergency number with the structure 030-XXX. In this scenario, the calling line information (CLI) has to be changed when using 112 or

110 to ensure that the control center operator receives a CLI from Berlin. The carrier must support the CLIPNOSCREEN feature for this. The calling number can be modified in HiPath 4000 using the AMO KNMAT. Examples of how to implement the AMO KNMAT are provided below.

The situation becomes more complex when the customer is operating a number of CO accesses in different local networks, as is the case in IPDA environments. The emergency call concept for stations without emergency numbers (Up0E or analog stations) must not be affected by this scenario. Examples of this are provided in the following sections.

2.2 Stationary telephones without emergency number at a HiPath 4000 host system with an IPDA shelf with separate trunk access

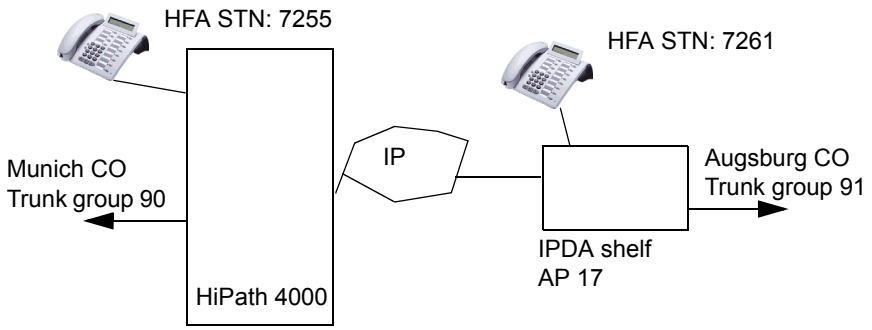


Figure 2 *Stationary HFA stations in an IPDA system with two CO accesses in different local networks. No emergency number used.*

The emergency number is not important in the following example. The telephones should always be stationary. There are no mobile HFA stations here. This example is only based on source-group-dependent routing, as used in IPDA.

We will return to this example later (Section 1.5) and add mobile stations to this base configuration.

In the scenario shown here, station 7255 is located in the HiPath 4000 host system with trunk access in Munich, while station 7261 is configured in an IPDA shelf with a trunk access in Augsburg. The station in the host system should call the control center 112 via the CO access in Munich, while the station in AP17 should call it via the CO access in Augsburg.

In IPDA environments, the emergency call problem is resolved - like all LCR issues - by using source groups.

The station in the host is assigned source group 1, while the station in AP17 is assigned source group 17. In source group 1, the number 0-112 is assigned to LRTE 191 and consequently trunk group 90 with the AMOs LDPLN and LPROF.

In source group 17, the number 0-112 is assigned LRTE 291 by the AMOs LDPLN and LPROF and is routed via trunk group 91 in Augsburg.

As station 7255 is assigned to virtual node 1-89-200, it's calling line information (CLI) is from the local Munich network. Station 7261, on the other hand, belongs to virtual node 1-89-201 and uses its CLI to signal that it belongs to the local Augsburg network.

The configuration for source group 1 is as follows:

```
ADD-RICHT:MODE=LRTENEW,LRTE=191,LSVC=ALL,NAME="EMERG MCH",
TGRP=90,DNNO=1-89-299,EMCYRTT=NO,INFO="EMERG MCH", PDNNO=10-89-
299;

ADD-LDAT:LROUTE=191,LSVC=ALL,LVAL=1,TGRP=90,ORD=91,LAUTH=1;

ADD-LODR:ODR=91,CMD=ECHO,FIELD=3;
ADD-LODR:ODR=91,CMD=NPI,NPI=ISDN,TON=SUBSCR;
ADD-LODR:ODR=91,CMD=END;
ADD-LODR:ODR=91,INFO="ICN CO ISDN LOCAL";

ADD-LPROF:PROFNAME="EMERG",SRCGRP=1,LRTE=191,PROFIDX=1;

ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="0"-"W"-"112",PROFIDX=1,
LAUTH=1;
```

Remark: EMCYRTT=NO can be set because emergency numbers are not used in this section.
The configuration for source group 17 is as follows:

```
ADD-RICHT:MODE=LRTENEW,LRTE=291,LSVC=ALL,NAME="EMERG AP17",
TGRP=91,DNNO=1-89-298,EMCYRTT=NO,INFO="EMERG AUG", PDNNO=10-89-
298;

ADD-LDAT:LROUTE=291,LSVC=ALL,LVAL=1,TGRP=91,ORD=91,LAUTH=1;

ADD-LODR:ODR=91,CMD=ECHO,FIELD=3;
ADD-LODR:ODR=91,CMD=NPI,NPI=ISDN,TON=SUBSCR;
ADD-LODR:ODR=91,CMD=END;
ADD-LODR:ODR=91,INFO="ICN CO ISDN LOCAL";

CHANGE-LPROF:PROFIDX=1,SRCGRP=17,LRTE=291;
```

The LDPLN with PROFIDX=1 has already been configured.

The source group for the station is usually set with the AMO UCSU for the entire IPDA shelf.

The CLI is set for the station with the AMO KNDEF.

For the host system in Munich (virtual node number 1-89-200):

```
ADD-KNDEF:NNO=1-89-
200,TYPE=OWN,ISDNCC=49,ISDNAC=89,ISDNLC=89200;
```

For the IPDA shelf (AP17) in Augsburg:

```
ADD-KNDEF:NNO=1-89-201,TYPE=OWN,ISDNCC=49,ISDNAC=871,ISDNLC=87;
```

The station is assigned to the virtual node in the AMO SDAT.

```
CHANGE-SDAT:STNO=7255,TYPE=DATA1,NNO=1-89-200;
```

```
CHANGE-SDAT:STNO=7261,TYPE=DATA1,NNO=1-89-201;
```

NOTE: The control center operator could select the wrong control center, for example, if station 7261 in Augsburg used the Munich calling number and is assigned to virtual node 1-89-200. In such configurations, KNMAT can be used to change the calling number to Augsburg.

2.3 Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network

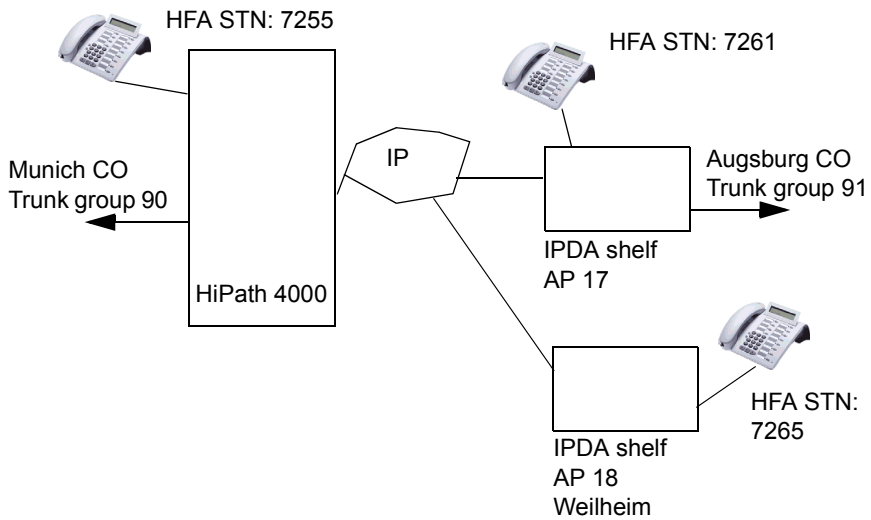


Figure 3 *The example in Section 2.2, "Stationary telephones without emergency number at a HiPath 4000 host system with an IPDA shelf with separate trunk access" is expanded to include an IPDA frame with no central office. Stations are still stationary (not mobile). No emergency numbers are used.*

Nothing changes vis-à-vis the previous example for stations in the host or AP17.

Stations in AP18 with no separate CO access encounter the following problems:

- The IPDA shelf is located in a branch office in Weilheim (local network 881)
- The stations in the IPDA shelf AP18 generally use the CO access in the host system (Munich 89) and have a Munich CLI.
- Emergency calls from stations in AP18 should be routed to the control center in Weilheim. As the system does not have a trunk access in Weilheim, breakout to the control center should occur in Munich. However, breakout into the Munich CO is not possible with 881 - 112 ISDN NATIONAL because 112 cannot be routed with a prefix. A substitute number is therefore needed for

the control center in Weilheim. In this example, we use the dummy 881 - 12345 (the real number in Bavaria is 881-19222 and can be dialed with the local area code).

- The stations should only use a CLI from Weilheim for emergency calls. This can be set with the AMO KNMAT.

The configuration for emergency calls in AP18 is as follows:

The LDPLN entry that links the emergency call dial pattern to PROFIDX=1 exists already:

```
ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="0"-"W"-"112",PROFIDX=1,
LAUTH=1;
```

The stations in AP18 should evaluate this digit pattern differently than the stations in the host or in AP17. If a station in AP18 dials 0-112, HiPath 4000 should replace 0-112 with 00-881-12345 (dummy station number of a control center in Weilheim).

A new LRTE must be configured for this:

```
ADD-RICHT:MODE=LRTENEW,LRTE=391,LSVC=ALL,NAME="CO EMERG AP18",
TGRP=90,DNNO=1-89-251,EMCYRTT=NO,INFO="CO EMERG AP18",PDNNO=10-
89-251;

ADD-LODR:ODR=391,CMD=OUTPULSE,DGTS=88112345;
ADD-LODR:ODR=391,CMD=NPI,NPI=ISDN,TON=NATIONAL;
ADD-LODR:ODR=391,CMD=END;
ADD-LODR:ODR=391,INFO="EMERG AP18";

ADD-LDAT:LROUTE=391,LSVC=ALL,LVAL=1,TGRP=90,ORD=391,LAUTH=1&51;
```

The stations in AP18 are assigned to source group 18 in the AMO UCSU. Source group 18 generally uses the same LRTEs as source group 1 because the stations in AP18 must break out into the CO in Munich. The LRTE just configured (391), however, should be used if 0-112 is dialed. The PROFIDX=1 parameter consequently has to be modified now in the AMO LPROF:

```
CHANGE-LPROF:PROFIDX=1,SRCGRP=18,LRTE=391;
```

The appearance of the entire LPROF is now as follows:

```
+-------------------------------------------------------------+
|                                                             |
| LCR PROFILE: 1           NAME: EMERG                        |
|                                                             |
+------------+------------+------------+------------+--------+
|SRCGRP LRTE |SRCGRP LRTE |SRCGRP LRTE |SRCGRP LRTE |SRCGRP LRTE
+------------+------------+------------+------------+--------+
|  1    191  |  17   291  |  18   391  |            |        |
+------------+------------+------------+------------+--------+
```

All requirements in terms of the number dialed are now satisfied. However, station 7265 in AP18 is assigned to the virtual node 1-89-200 (Munich). This is beneficial for features such as callback and should not be changed.

The calling party's number can lead to confusion among control center operators, though, as it suggests that the emergency call displayed is from a station in the local Munich network. The emergency-call-specific CLI can be modified with the AMO KNMAT. For this to work, the carrier must also set CLIPNOSCREEN on the trunk.

```
CHANGE-
KNMAT:NPI=ISDN,LEVEL=0,ONNO=200,DNNO=251,MODCON=OUT,NUMEXT=4988188, NUMRED=498989200;
```

This KNMAT entry means that a subscriber in node 200 who dials destination node number 251 (see RICHT for LRTE 391) uses information from the local Weilheim network (4988188) instead of a number from the local Munich network (498989200). In this case, 49 stands for Germany, 881 for Weilheim, and 88 is a dummy local code. The local code 88 should have been entered in the database at the control center.

A complete solution for IPDA systems with **stationary stations** has been described in Section 2.2, "Stationary telephones without emergency number at a HiPath 4000 host system with an IPDA shelf with separate trunk access" and Section 2.3, "Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network". **Up until now, no emergency numbers have been needed**.

This all changes, however, as soon as mobile IP stations are added to the configuration, as shown in the next example. Despite this change, source-group-dependent routing should always be configured in IPDA systems because the individual shelves always contain stationary stations for which emergency calls should also work.

Examples

Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network

3 Emergency calls with emergency numbers and mobile HFA in an IPDA environment

Mobile HFA is a feature that has been available for stationary HFA telephones (optiPoint 400/410/420/600) since HiPath 4000 V2. This feature lets a user register at his or her home HG3530 by dialing codes at an operational HFA telephone. This action temporarily logs off the user's original device. For information on how to configure the feature, refer to the description in the Service Manual.

The following scenarios are based on the example in Section 2.3, "Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network":

1. HFA stations from home HG3530 in AP17 or AP18 register at an HFA station in the host system.
2. HFA stations from home HG3530 in the host system or AP18 register at an HFA station in AP17.
3. HFA stations from home HG3530 in the host system or AP17 register at an HFA station in AP18.

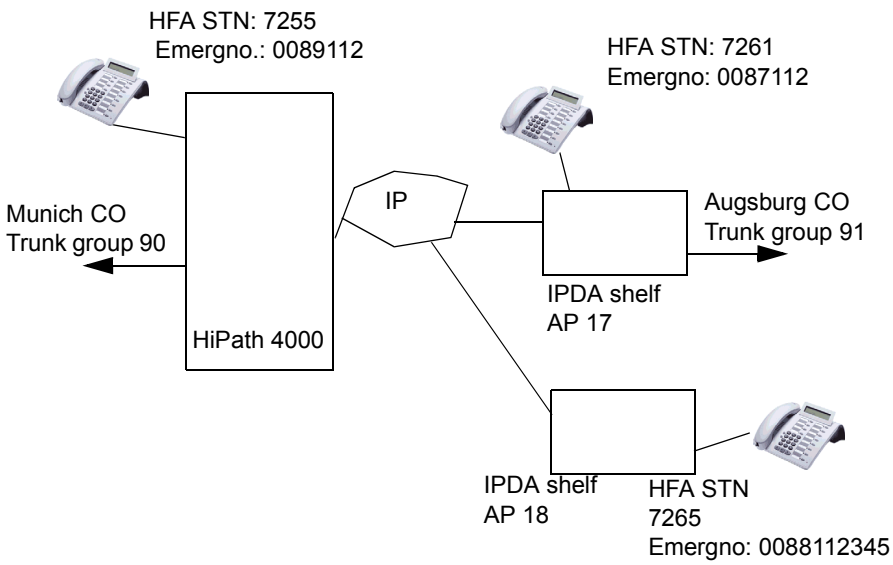


Figure 4 All stations are mobile and have an emergency number

3.1 IP telephone visited in the host

If a user from the location in Augsburg (AP17) or Weilheim (AP18) performs mobile HFA registration at the host, then a control center in Munich should be alerted when he or she sets up an emergency call with 0-112. As the visitor is still using his or her home HG3530 via mobile HFA and is still assigned his or her source group, the station in Augsburg would reach a control center in Augsburg via LRTE 291 and the station in Weilheim would reach a control center in Weilheim (LRTE 391) without an emergency number.

In our example, the HFA telephone in Munich is assigned the emergency number 0089112 by the local Munich network:

```
AB-SBCSU:7255,OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN ---------------OPTIIP  -----7255-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID-------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                     |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT420 ADVANCE/4LD            |  0  | 4A 10 47 8E | 5.1.32  |   0  |
| OPTIPOINT420 KEY MODULE 1           |     |             | SK01.03 |   0  |
| OPTIPOINT420 CONTROL ADAPTER 1      |     |             | 0000000 |   0  |
+-------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ----------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4         |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL    |
|                  SLKKONT  : 2                                           |
+-------------------------------------------------------------------------+
+-------------- IP SETTINGS ------------------------------------------------+
| IPADR    : 001.089.021.093        EMERG NO : 0089112                    |
| SW-CAPAB : MOBHFA    DMC_V1           LIN :                             |
+-------------------------------------------------------------------------+
```

If station 7261 in AP17 (Augsburg) registers at this telephone, it takes over the emergency number. A user at this station dials 0-112 and, because the station belongs to source group 17, it is assigned to LRTE 291. EMCYRTT=YES must now be set for this LRTE:

```
CHANGE-RICHT:MODE=LRTE,LRTE=291,EMCYRTT=YES;
```

The number 0-112 is now replaced by 0-0-89-112 and routed to the CO in accordance with LRTE 72 from Section 1.2.

However, as station 7261 is assigned to virtual node 1-89-201, it uses the Augsburg calling number. This can be changed into a Munich CLI with KNMAT.

```
CHANGE-
KNMAT:NPI=ISDN,LEVEL=0,ONNO=201,DNNO=299,MODCON=OUT,NUMEXT=49898
9200,NUMRED=4987187;
```

Station 7265 in AP18 (Weilheim) should now log on to 7255 (host) via mobile HFA. If a user at this station dials 0-112, the station is assigned LRTE 391 from Section 2.3, “Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network” because it belongs to source group 18. EMCYRTT=YES must now be set for LRTE 391:

```
CHANGE-RICHT:MODE=LRTE,LRTE=391,EMCYRTT=YES;
```

Emergency number 0-0-89-112 is now used. Like the Augsburg station, the Weilheim station uses LRTE 72 to reach the trunk access. However, as the station in Weilheim belongs to node 1-89-200, it does not need a KNMAT entry because it uses the Munich calling line information by default.

NOTE: Basically, it is only necessary to set EMCYRTT=YES in the LRTE for the emergency number dialed (here, 0-112) to ensure that emergency number replacement is performed. The emergency number itself it then routed to an LRTE with EMCYRTT=NO.

3.2 The telephone visited is in an IPDA shelf with trunk access (AP17)

This section starts by looking at a scenario where station 7255 uses mobile HFA to register at HFA telephone 7261 in AP17 (Augsburg) from the host system in Munich.

The emergency number is set as 00871112 in HFA telephone 7261. This emergency number is supposed to be used to break out into the local trunk access in Augsburg (trunk group 91).

```
AB-SBCSU:7261,OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN ---------------OPTIIP  -----7261-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID-------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                     |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT410 STANDARD               |  0  | 50 C8 62 18 | 5.1.32  |  0   |
| OPTIPOINT410 KEY MODULE 1           |     |             | 0000000 |  0   |
| OPTIPOINT410 CONTROL ADAPTER 1      |     |             | 0000000 |  0   |
+-------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ------------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4           |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL      |
|                  SLKKONT  : 2                                             |
+---------------------------------------------------------------------------+
+------------- IP SETTINGS -------------------------------------------------+
| IPADR    : 001.089.021.091       EMERG NO : 00871112                      |
| SW-CAPAB : MOBHFA    DMC_V1          LIN :                                |
+---------------------------------------------------------------------------+

AMO-SBCSU-111       ENDGERAETE- UND S0-BUS-KONFIGURATION IN SWU
ABFRAGEN DURCHGEFUEHRT;
```

Station 7255 uses mobile HFA to take over this emergency number and dials 0-112 from its source group 1. The dial operation is assigned to LRTE 191 via PROFIDX=1 in the AMO LPROF (Section 2.3, “Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network”). EMCYRTT=YES must now be set in the AMO RICHT for this LRTE.

```
CHANGE-RICHT:MODE=LRTE,LRTE=191,EMCYRTT=YES;
```

The number 0-112 is now replaced by 00871112 for this LRTE. This digit pattern needs an LRTE to break out into the Augsburg central office:

```
ADD-RICHT:MODE=LRTENEW,LRTE=282,LSVC=ALL,NAME="EMERG AUGSBURG",
TGRP=91,DNNO=1-89-282,EMCYRTT=NO,INFO="EMERG AUGSBURG",PDNNO=10-
89-282;
```

Outdial rule 87 from Section 1.2 is used in LDAT (ECHO 5 - ISDN SUBSCR):

```
ADD-LDAT:LROUTE=282,LSVC=ALL,TGRP=91,ODR=87,LAUTH=1;
```

```
ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="0"-"W"-"0"-"871"-"112",
LROUTE=282,LAUTH=1;
```

This emergency call set up reaches the control center in Augsburg but with Munich calling line information because 7255 is assigned to node 1-89-200.

You can correct this with a KNMAT entry:

```
CHANGE-
KNMAT:NPI=ISDN,LEVEL=0,ONNO=200,DNNO=282,MODCON=OUT,NUMEXT=49871
87,NUMRED=498989200;
```

This AMO changes 7255's CLI for the emergency call in Augsburg to the local Augsburg network.

The second scenario involves a station in Weilheim (AP18) that registers at an HFA telephone in Augsburg via mobile HFA. In our scenario, this means that 7265 registers at station 7261.

This scenario is already configured. Station 7265 takes over extension 7261's emergency number (00871112). Station 7265 dials 0-112 from source group 18 and is assigned to LRTE 391 in the AMO LPROF, PROFIDX=1. EMCYRTT=YES was already set for LRTE 391 in the AMO RICHT in Section 1.5.1.

This AMO parameter replaces 0-112 with 00871112. The host evaluates 00871112 for station 7255 over LRTE 282. Breakout to the control center in Augsburg occurs over the Augsburg CO access. Station 7265 belongs to the same virtual node 1-89-200 as station 7255 from the host. The same KNMAT applies from node 200 to node 282 for this station and 7261 has location-based CLI from Augsburg.

3.3 The telephone visited is in an IPDA shelf with no trunk access (AP18)

The IPDA shelf AP18 in Weilheim is home for HFA station 7265. The emergency number set at this telephone is 0088112345. As already shown, its emergency number cannot be 00881112 because AP18 has no trunk access in Weilheim and the public network is unable to route 112 with a prefix.

```
AB-SBCSU:7265,OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN ---------------OPTIIP  -----7265-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID-------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                     |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT410 ECONOMY                |  0  | 48 A0 65 56 | 5.1.32  |   0  |
| OPTIPOINT410 KEY MODULE 1           |     |             | 0000000 |   0  |
| OPTIPOINT410 CONTROL ADAPTER 1      |     |             | 0000000 |   0  |
+-------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ------------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4           |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL      |
|                  SLKKONT  : 2                                             |
+---------------------------------------------------------------------------+
+------------- IP SETTINGS ---------------------------------------------------+
| IPADR    : 001.089.021.094        EMERG NO : 0088112345                   |
| SW-CAPAB : MOBHFA    DMC_V1           LIN :                               |
+---------------------------------------------------------------------------+
```

If this telephone is visited by station 7255 from the host, it should use this emergency number and break out into the local Munich network.

No changes are needed initially for station 7255. This station dials 0-112 and is assigned to LRTE 191 in accordance with the its source group 1. This is performed with EMCYRTT=YES. The number 0-112 is replaced by 0088112345.

```
CHANGE-RICHT:MODE=LRTE,LRTE=191,EMCYRTT=YES;
```

Evaluation must be performed for actual breakout with 0088112345.

```
ADD-RICHT:MODE=LRTENEW,LRTE=281,LSVC=ALL,NAME="EMERG WEILH",
TGRP=90,DNNO=1-89-281,EMCYRTT=NO,INFO="EMERG MOBAP18",PDNNO=10-
89-281;
```

Outdial rule (ODR) 281 is used in the AMO LDAT with ECHO 4/ECHO 5/ISDN NATIONAL:

```
ADD-LDAT:LROUTE=281,LSVC=ALL,LVAL=1,TGRP=90,ORD=281,LAUTH=1&51;
```

and the LDPLN is:

```
ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="0"-"W"-"0"-"881"-
"12345",
LROUTE=281,LAUTH=1;
```

This is how the control center in Weilheim is reached from the local Munich network.

Station 7255 has Munich CLI because it is assigned to the virtual node 1-89-200. This CLI should be switched to the current Weilheim location.

```
CHANGE-
KNMAT:NPI=ISDN,LEVEL=0,ONNO=200,DNNO=281,MODCON=OUT,NUMEXT=49881
88,NUMRED=498989200;
```

All settings are now complete for station 7255.

Finally, let's consider Augsburg's station 7261 which is performing mobile HFA in Weilheim. This station is once again using the emergency number associated with the home HFA telephone 7265 (008818812345).

If station 7261 (at AP17) now dials 0-112 from the location in Weilheim, it uses LRTE 291 in accordance with its source group 17. EMCYRTT=YES is already set for LRTE 291 so that 0-112 is once again replaced by the current emergency number 0088112345. As already indicated for station 7255, 0088112345 is evaluated with the LRTE 281 just configured and breakout into the control center in Weilheim takes place in the local Munich network.

As a result, the only thing that needs to be considered here is the calling line information. Station 7261 belongs to virtual node 1-89-201 and therefore signals the local Augsburg network. Another KNMAT provides a Weilheim CLI for the emergency call.

```
CHANGE-
KNMAT:NPI=ISDN,LEVEL=0,ONNO=201,DNNO=281,MODCON=OUT,NUMEXT=49881
88,NUMRED=4987187;
```

All requirements are now satisfied for 7261.

3.4 Stations with active emergency numbers at their default location

At this point, we should take a brief look at what happens in this configuration if stations 7255, 7261, and 7265 do not operate as mobile stations and use their extensions at home.

Emergency numbers are now set for all these HFA telephones. If 0-112 is dialed, 7255 uses LRTE 191, 7261 uses LRTE 291, and 7265 uses LRTE 391. As EMCYRTT=YES is set for all these LRTEs in the relevant AMO RICHT, the relevant emergency number is used even if the stations are in their home locations.

Station 7255 (emergency number 0089112) uses LRTE 72 from Section 2.1, “HFA telephone with emergency number at a HiPath 4000 host system without IPDA” to break out into the control center in Munich and its calling line information correctly indicates its location as Munich (virtual node 1-89-200).

Station 7261 (emergency number 00871112) uses LRTE 282 from Section 3.2, “The telephone visited is in an IPDA shelf with trunk access (AP17)” to break out into the control center in Augsburg. Its CLI correctly indicates its location as Augsburg (virtual node 1-89-201).

Station 7265 (emergency number 0088112345) then uses LRTE 281 from Section 3.3, “The telephone visited is in an IPDA shelf with no trunk access (AP18)” to break out into the control center in Weilheim. Its CLI is switched from the local Munich network to the local Weilheim network by the AMO KNMAT configured in Section 3.3, “The telephone visited is in an IPDA shelf with no trunk access (AP18)”.

What happens to stations without emergency numbers in the individual locations? Everything works properly for these extensions because they immediately opt for source-group-dependent LCR as described in Section 2.2, “Stationary

telephones without emergency number at a HiPath 4000 host system with an IPDA shelf with separate trunk access" and Section 2.3, "Stationary telephone at a HiPath 4000 host system with an IPDA shelf with no trunk access in the local network".

Conclusion:

The solution provided here for IPDA systems with CO accesses in different local networks is based on the following principle:

- The LRTEs for the station numbers dialed (0-112) must be configured as source-group-dependent to ensure that emergency calls are correctly routed for stationary stations without emergency groups.
- The LRTEs for the emergency numbers are configured independently of source groups because routing must be identical for stations in all source groups.

3.5 Emergency calls with the mobile HFA in a HiPath 4000 network

HFA mobile can also be used between different nodes in a HiPath 4000 network. Compared to the previous scenario, this scenario offers nothing new as illustrated by the following thought experiment.

Let's assume that Herr Schmidt, a user at a HiPath 4000 node in Berlin, visits the Munich location in our example. The Berlin node is networked with the Munich node with ECMA V2 - segment 8. In Munich, Herr Schmidt goes to extension 7255 and uses mobile HFA to log on to his home HG3530. He is now a subscriber at his home node in Berlin. He adopts the emergency number from the HFA telephone visited (0089112). If he dials 0-112 now, he must set EMCYRTT=YES in the AMO RICHT for the relevant LRTE associated with the Berlin node so that he can use the emergency number. The number 0-112 is then replaced by 0089112. This number must now be transferred from the Berlin node to the Munich node via the tie line. The trunk circuit there is then used to break out into the Munich control center. The calling line information can also be set here with KNMAT.

4 Soft clients and emergency numbers

Soft clients, such as, optiClient 130, also recognize emergency numbers. These can be entered as follows:

- Start the optiClient 130 and select **Manage**.
- Select **Settings** in the menu.
- Select the **Provider Modules** tab and enter the emergency number as **Emergency call number** in the submenu **HiPath Provider > Main Connection**:

As in stationary HFA devices, the emergency number is transferred to the SBCSU:

```
AB-SBCSU:7259,OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN --(SOFTCLIENT)-OPTIIP  -----7259-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID-------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                     |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT410 STANDARD               |  0  | 04 88 00 00 | 5114100 |   0  |
| OPTIPOINT410 KEY MODULE 1           |     |             | 0000000 |   0  |
| OPTIPOINT410 CONTROL ADAPTER 1      |     |             | 0000000 |   0  |
+-------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ------------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4          |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL     |
|                  SLKKONT  : 2                                             |
+---------------------------------------------------------------------------+
+-------------- IP SETTINGS ------------------------------------------------+
| IPADR    : 001.089.021.002        EMERG NO : 003012345                    |
| SW-CAPAB : DMC_V1                     LIN :                               |
+---------------------------------------------------------------------------+

AMO-SBCSU-111       ENDGERAETE- UND S0-BUS-KONFIGURATION IN SWU
ABFRAGEN DURCHGEFUEHRT;
  <
```

optiClient 130 supports the creation of location-specific profiles, each containing a different emergency number. You could therefore create a location profile for Munich containing the following emergency number.

Manage > Settings > Provider Modules > HiPath Provider > Main Connection > Emergency call number: 0089112

The Munich emergency number is displayed when you log on with the Munich profile:

```
AB-SBCSU:7259,OPTIDAT;
H500:  AMO SBCSU GESTARTET

+----- SPEZIFISCHE GERAETEDATEN --(SOFTCLIENT)-OPTIIP  -----7259-----------+
|                                                                           |
+----PHONE-ID / OPTION-ID-------------+-EXT-+--ASSET-ID---+-SW-VERS-+-TEST-+
|                                     |     | TASTATURTYP | BOOT-SW |HWVERS|
| OPTIPOINT410 STANDARD               |  0  | 04 88 00 00 | 5114100 |   0  |
| OPTIPOINT410 KEY MODULE 1           |     |             | 0000000 |   0  |
| OPTIPOINT410 CONTROL ADAPTER 1      |     |             | 0000000 |   0  |
+-------------------------------------+-----+-------------+---------+------+
+-------- HARDWARE SETTINGS ------------------------------------------------+
| RUFLAUT  : 4     AUFMLAUT : 2     GESPLAUT : 1     LSPRLAUT : 4          |
| RUFKLANG : 2     AUSGBKON : 2     ROLLLAUT : 3     RAUMCHAR : NORMAL     |
|                  SLKKONT  : 2                                             |
+---------------------------------------------------------------------------+
+-------------- IP SETTINGS ------------------------------------------------+
| IPADR    : 001.089.021.002       EMERG NO : 0089112                      |
| SW-CAPAB : DMC_V1                   LIN :                                 |
+---------------------------------------------------------------------------+

AMO-SBCSU-111       ENDGERAETE- UND S0-BUS-KONFIGURATION IN SWU
ABFRAGEN DURCHGEFUEHRT;
  <
```

Configuration is identical in HiPath 4000 for optiClient 130 and the sample stationary HFA telephones shown here.

Based on our example, this means that an optiClient 130 requires three location profiles: one for Munich with emergency number 0089112, one for Augsburg with emergency number 00871112, and one for Weilheim with emergency number 0088112345. When dialed, the number 0-112 is evaluated with the same LCR route number as set.

A weak point in optiClients is that it is the user who selects the profile when starting the program. The user's optiClient nevertheless operates exactly the same with the Augsburg profile as with the Munich profile - it just doesn't route the emergency calls as required.

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