The German BK network:
An overview in pictures

Munich, June 2005
The main elements of a typical German CATV network
Most of the network elements are located in the network level 3

**master head-end ("BKVSt")**
- 1 / metropolitan area or per several cities
- Content is received from satellite
- TV signal is formed and distributed to head-ends

**head-end ("üBK")**
- 1 / city
- Local channels are added
- Amplifies and distributes signal to hubs

**hub ("bBK")**
- 1 / part of city or per town
- Amplifies and distributes signal into coax distribution network (main streets)

**street amplifier ("VrP")**
- Amplifies signal approx. every 320m

**home connect. point ("HÜP")**
- 1 / home
- Approx. 8 million HÜPs in Germany
- End of level 3 network
- Start of level 4 inhouse network

**In-house network**
- Coax distribution network inside houses
- Approx. 27 million households that are reachable by cable networks

*Radio links are currently being replaced by optical fiber connections

Source: Solon
In a coax cable, frequencies between 5MHz and approx. 1000MHz (=1GHz) can be transmitted

- Currently, in a standard, non-upgraded network, TV and radio signals are being broadcasted between 47MHz and 470MHz in the framework of the PAL standard
- The spectrum is organized in „bands”, like „SU” (special lower band), „SO” (special upper band) or the hyperband
- In order to extend the spectrum beyond the standard limit of 470MHz, the network has to be upgraded:
  - To extend the spectrum until 606MHz, an exchange of street amplifiers has to be performed
  - To extend the spectrum until 862MHz, some of passive splitters and buried taps have to be exchanged
- To enable interactivity (e.g. high speed internet, telephony), amplifiers modules for two-way transmission of signals have to be added, i.e. street amplifiers cabinets have to be modified
- Every TV channel is 7 MHz and 8 MHz wide, respectively.
- An analogue TV channel transmits one PAL program.
- A digital TV channel transmits 8-12 digital programs ("streams").

* 7 MHz: 47-300 MHz; 8 MHz: above 300 MHz

Source: KDG, Solon
The master head-end at the Munich TV tower

The master head-end on the TV Tower, 155m above ground:
- Satellite antennas receiving the signals
- Cables from antennas to the equipment of the master head-end
- The master head-end: processing the signals and “packaging” them
- Cable to amplifier node
- Amplifier node

The head-end in the basement of the TV tower
- Amplification of signals,
- Cables to hubs, leaving the head-end
- Cable to DIAMANT system in the tower (leaving to other, more distant hubs)
Satellite antennas receive the TV signals

Location: master head-end (TV tower)

- Demodulation into TV-channels
- Forming the final* signal by multiplexing the channels

* Except some local TV channels that are added later (at local head-end)

Source: Solon
The head-end ("üBK") serves an entire city

Incoming coax-cable (from master head-end at roof/platform of TV tower)

Outgoing cables to hubs (coax cables and optical fibre lines)

Source: Solon
The hub serves parts of a city

Source: Solon
Cables leaving the hub to follow down the streets

Hub
Cables inside hub facility
Duct entry on pavement
Duct with cables

Source: Solon
An amplifier street cabinet: The signal in coax cables has to be amplified approx. every 300m.
A typical in-house (NE4) network serving 12 appartments

<table>
<thead>
<tr>
<th>NE3</th>
<th>NE4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Home connection</td>
<td>NE4 in-house network</td>
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<tr>
<td>point (“HÜP”)</td>
<td>2 Amplifier</td>
</tr>
<tr>
<td></td>
<td>3 Splitter</td>
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</tbody>
</table>

Cables to appartments (in-house wiring, here: star topology)

Number and type of modules depends on characteristics of in-house network
Equipment of different suppliers is being used

Source: Solon
This information intends to provide an overview of the structure of a typical German BK network and its elements.

Some of the complex infrastructure and network technology is illustrated in a simplified way.

Pictures in this document are examples for typical configurations.

The document is based on various data sources. The pictures show typical network elements of a German level 3 network.

During recent months, networks have partly been optimized with respect to the structure of the network level 2. The general structure shown in this document however still remains unchanged.
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