



Kommunikation i døgndrift

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About IHM VoIP

Description of IHM VoIP enabled products and protocols used.

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1 Products



2 TCP/IP Principe

All IHM IP enabled products operates either as a *Master* or as a *Slave* unit. COM53 and HM817/2 can both be configured to both functions, whereas TE10-40/3 is always a slave and HM817/1 is always a master.

Establishment of the IP-connection between 2 products always starts when the *Master* module sends a UDP broadcast request to a specific IP-address and a specific programmable IP-port simply to locate the slave module. The *Slave* module answers the IP-address who called (*Master*), and then the *Master* module sets-up a UDP data stream between these two modules.

This means that Slave modules is only programmed with own IP address and Port, whereas the Master is programmed with own IP-address, Net-mask and default gateway as well as IP-addresses and IP-ports for all associated Slave modules.

2.1 Keep alive

Every 2 seconds a UDP data package is sent from master to slave, which the slave answers simply to verify the connection between the two modules. Included in the same package is also an update of status for in- and output ports. If this package and acknowledge is not received this package is retried in up to 8 seconds before the connection is considered faulty.

2.2 Control of inputs and outputs

In the second an input state changes a UDP package is send to the opponent, whom acknowledge the transmission.

If this acknowledge is not received this package is retried in up to 8 seconds before the connection is considered faulty.

2.3 Voice data

When voice is to be transmitted this happens via the DSP processor which collects voice data in 20 msec, forward this package to the ARM processor who packs these data into a UDP package and transmits this package to the opponent unit.

The opponent unit unpacks the UDP package sends it to the DSP processor which unpacks the data to 20 msec of voice which then is presented at the audio port.

If a package is corrupted it is lost as there is no retransmission included in the UDP protocol.

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3 Building up a network

When building up a network many factors influence on the final layout.

Some of the factors are: security against other users to get access, security for transfer of data, simplicity in the addressing and possibility for easy service access.

3.1 IP-addressing

Speaking of IP-addressing we find two structures for this.

Each and every unit in a network holds a unique IP-address while for every IP-address we see a number of Sub-addresses, also known as IP-ports.

Each IP-address can have up to 65536 ports defined. A number of these ports are reserved for special purposes for example is port 80 always for http which is for displaying Internet pages.

3.1.1 IP-address

When configuring an IP-Address for a given unit, this always is done in an address consisting of four blocks. Each of these blocks can hold values from 0-254.

Standards for which addresses should be used for internal networks and external networks are available, ask you network administrator.

A typical internal network address: 192.xxx.xxx.xxx.

3.1.2 Network mask

In order for a network unit to be able to find other units on the network we code the network structure, the so called network mask. This parameter is in the same way as the address defined in four blocks from 0-255.

This is a bit parameter that points out which bit are variables within the local network.

Typically used masks: 255.255.255.0 or 255.255.0.0

Say if the IP-address is 192.168.1.20 and the mask is 255.255.255.0, then the local network can hold IP-addresses in the range 192.168.1.0 to 192.168.1.154.

If the mask is set to 255.255.0.0 then the local network could hold addresses in the range 192.168.0.0 to 192.168.254.254.

3.1.3 Default gateway

The Default Gateway is the address of the unit in the network whom provides access to other networks.

This means that if we try to call an IP-address, which we from the mask can see does not belong to the local network this will be called via the Default Gateway. Meaning all signalling to external unit is routed via the Gateway.

The Gateway can then be configured with several form of blocking and translations of addresses. E.g. if an external unit calls a specific IP-port, this will be “translated” to a specific internal IP-address and perhaps another IP-port. This function is known as NAT.

3.1.4 MAC address

Besides the programmable IP-address, the unit holds a unique hardware coded address.

These addresses are provided by an international organisation to network component manufactures upon request. This MAC-address is an identity used by switches to control the IP traffic.

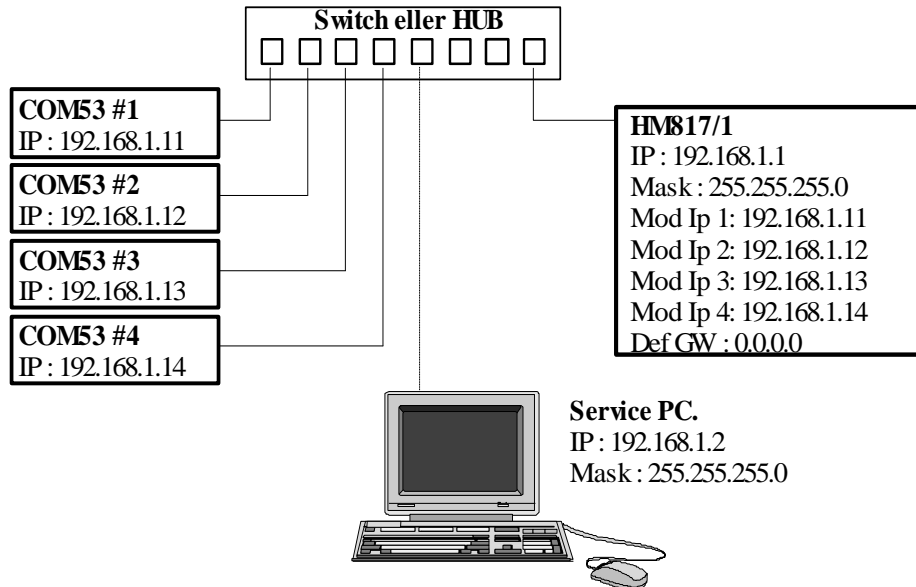
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4 Network configuration

4.2 LAN

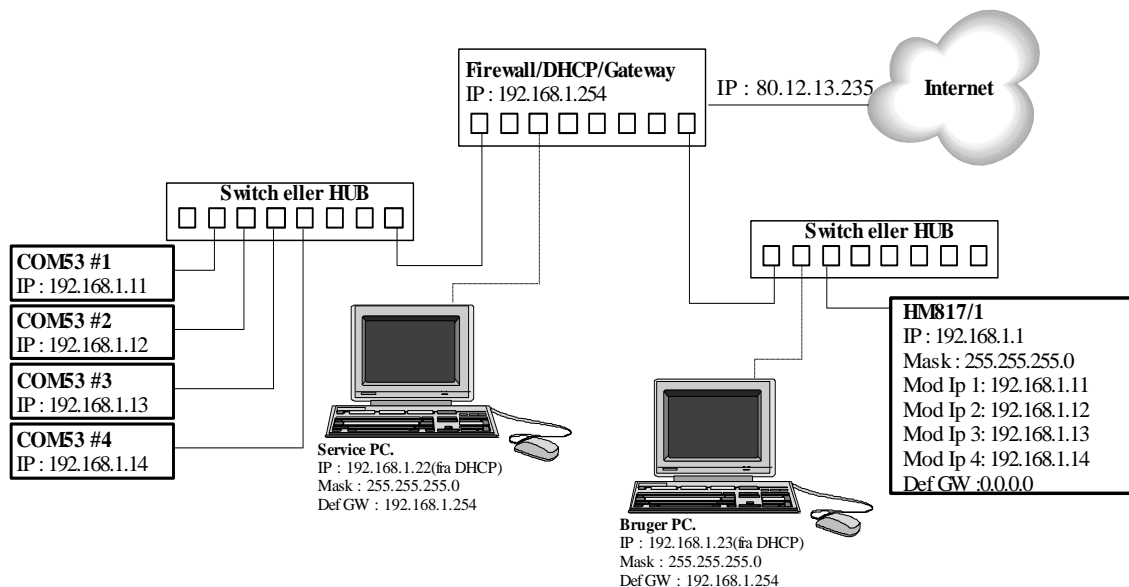
The examples in this chapter are only used in internal networks. It does not matter if the network is spread over several sites connected via links or fibre optics or kept within one site. The most important is the structure of IP-addressing.

4.2.1 Simple LAN no other users



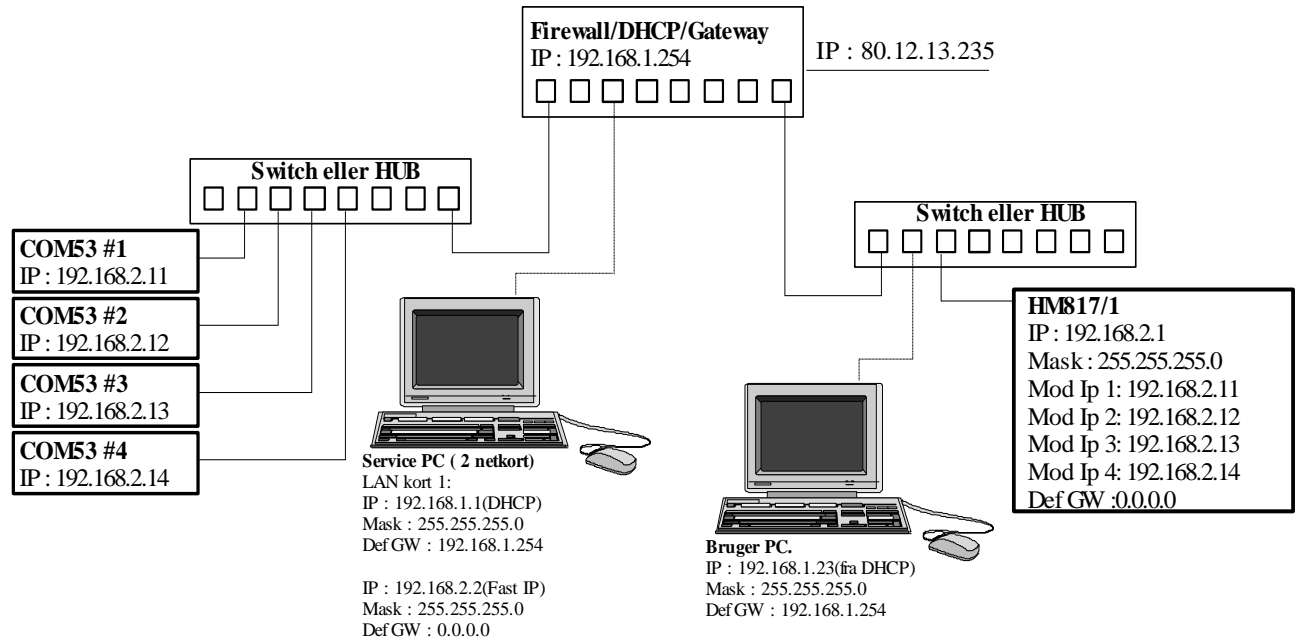
In the above configuration the network is only used for communication between HM817/1 and COM53. All units have a fixed IP-address and there is no need for further equipment. Using this configuration there are no access from external networks. It however is required that the Service PC is (re-)configured to an IP-address within the range, every time it is connected to the network.

4.2.2 Internal LAN without divided IP-space



In the above configuration we use an internal LAN for communication between HM817/1 and COM53. All IHM units have a fixed IP-address. In this configuration can all connected PC's in principle connect to the IHM units (e.g. acting as Service PC). Depending on how the firewall is programmed it is possible to get access to the internet from all PC's.

4.2.3 Internal LAN using divided IP-space



In the above configuration we use an internal LAN for communication between HM817/1 and COM53. All IHM units have a fixed IP-address that does not collide with other used addresses. It is therefore impossible to get access to the IHM units from other PC's than the Service PC. The Service PC is either configured with two network ports or re-configured each time required for service purposes. Depending on how the firewall is programmed it is possible to get access to the internet from all PC's.

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COM53 #1
IP : 192.168.1.1

COM53 #2
IP : 192.168.1.1

COM53 #3
IP : 192.168.1.1

COM53 #4
IP : 192.168.1.1

Bruger PC.
IP : 192.168.1.23(fra DHCP)
Mask : 255.255.255.0
Def GW : 192.168.1.254

Router/DHCP/NAT
LAN IP : 192.168.1.254
WAN IP: 87.50.141.46
NAT : Port 49160 -> 192.168.1.1
Port 50002 -> 192.168.1.1

Router/DHCP/NAT
LAN IP : 192.168.1.254
WAN IP: 87.52.12.78
NAT : Port 49160 -> 192.168.1.1
Port 50002 -> 192.168.1.1

Router/DHCP/NAT
LAN IP : 192.168.1.254
WAN IP: 87.51.14.98
NAT : Port 49160 -> 192.168.1.1
Port 50002 -> 192.168.1.1

Router/DHCP/NAT
LAN IP : 192.168.1.254
WAN IP: 80.157.23.24
NAT : Port 49160 -> 192.168.1.1
Port 50002 -> 192.168.1.1

HM817/1
IP : 192.168.1.1
Mask : 255.255.255.0
Mod Ip 1: 87.50.14.12
Mod Ip 2: 87.50.141.46
Mod Ip 3: 87.52.12.78
Mod Ip 4: 87.51.14.98
Def GW : 192.168.1.254

Service PC
IP : 86.54.21.98 (DHCP)
Mask : DHCP
DefGW : DHCP

Internet

128/128Kb

128/128Kb

128/128Kb

512/512Kb

The diagram illustrates a network topology. A central cloud labeled "MPLS via Internet" is connected to four "COM53" devices and a "Service PC".

- COM53 #1**: IP: 192.168.2.2, connected via 128/128Kb.
- COM53 #2**: IP: 192.168.3.2, connected via 128/128Kb.
- COM53 #3**: IP: 192.168.4.2, connected via 128/128Kb.
- COM53 #4**: IP: 192.168.5.2, connected via 128/128Kb.
- Service PC**: IP: 192.168.6.2, Mask: 255.255.0.0, DefGW: 192.168.6.1, connected via 512/512Kb.
- HM817/1**: A large box containing IP: 192.168.1.2, Mask: 255.255.0.0, Mod Ip 1: 192.168.2.2, Mod Ip 2: 192.168.3.2, Mod Ip 3: 192.168.4.2, Mod Ip 4: 192.168.5.2, and Def GW :192.168.1.1, connected via 512/512Kb.

