

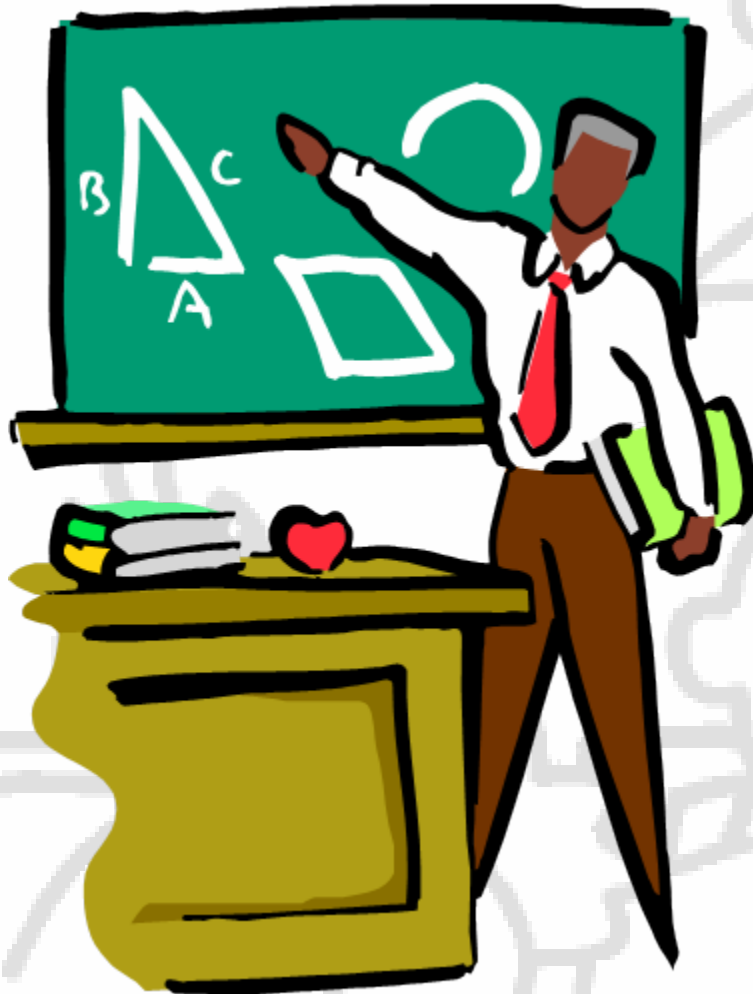


# **Proposed Instruction-Set**

**Optimized for Single-Chip-Microcontrollers  
Based on Actual MKVision-Instructions**

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SYSTECH GmbH**

# SYSTECH-Instruction-Set



- Easy to Decode and execute on single-chip-microprocessors
- Fixed Length Instructions
- Supports up to 5 Master-Units
- Supports Network-Coupling
- Easy Instruction Generation
- Proven Operation at 1200 bit/s

# What Teachers do..



1. Blank the screen and block mouse and keyboard
2. Broadcast a picture
3. Look into the students screen
4. Use the Beamer
5. ....

# Room-Image-Master

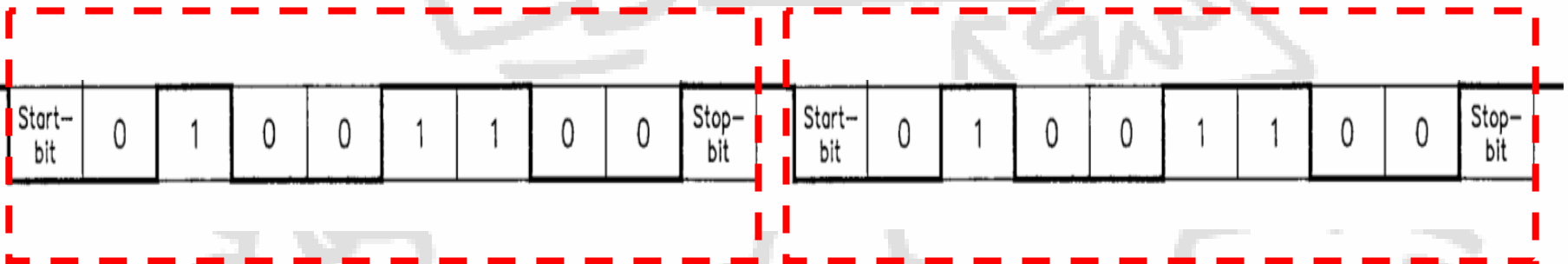


DBP Nr.19615705.6-35

# Instruction-Format RS-232

1. Byte Address

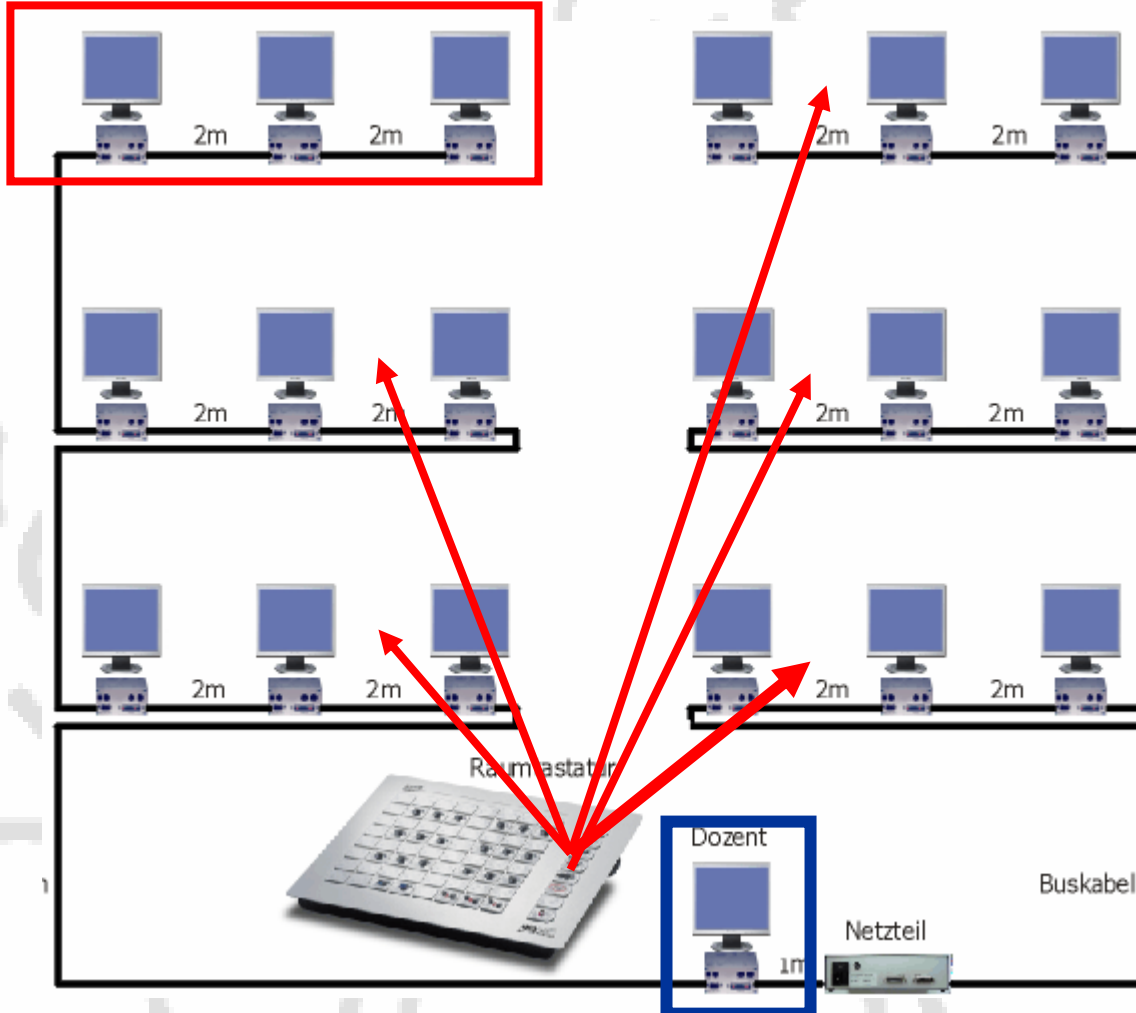
2. Byte Instruction/  
Payload



- Easy to decode instructions-set
- Fixed command-structure
- Timeout can count on fixed length

# General-Instructions affect all active units

Disabled  
group:  
Not  
affected

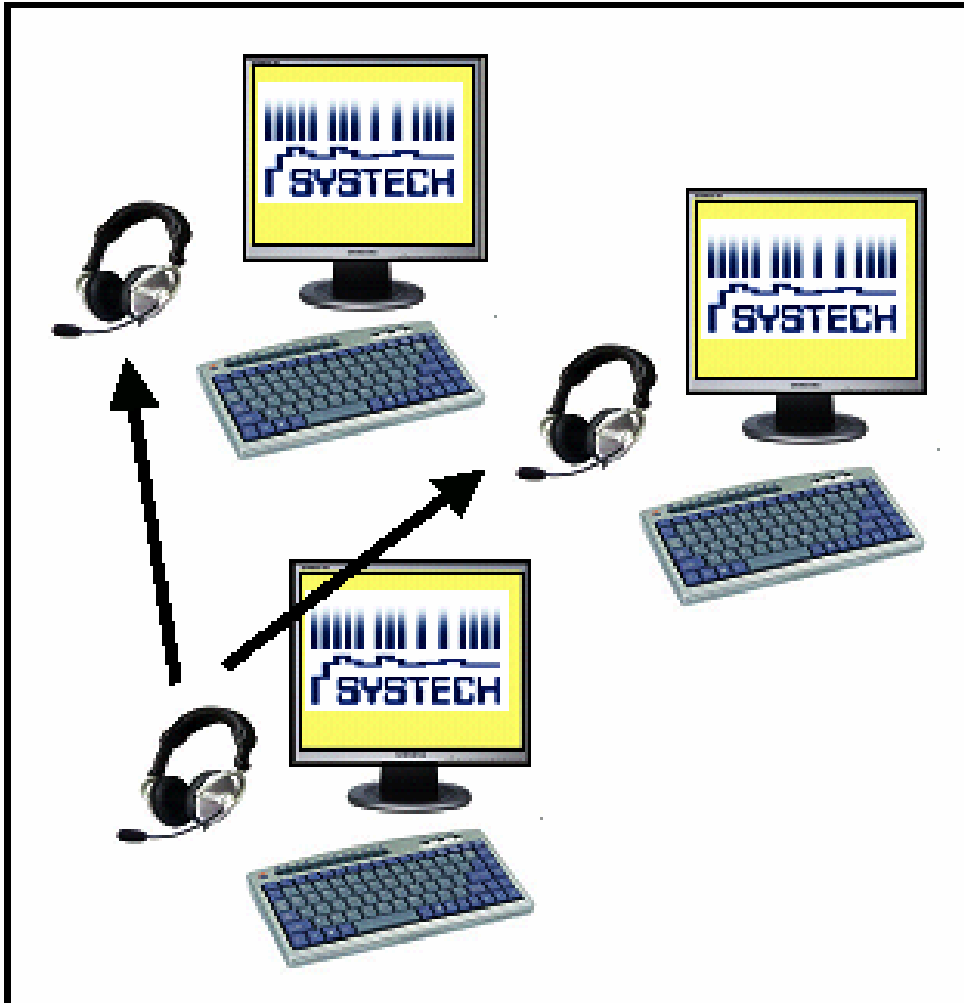


Teacher-  
and beamer-  
unit are  
handled  
differently

# Examples of General Instructions

<u>Instruction</u>	<u>Value (HEX)</u>	<u>Reply</u>	<u>Short Description</u>
<b>RXGRx</b>	<b>0x</b>	<b>none</b>	<b>Group x is activated</b>
<b>OFFGRx</b>	<b>06</b>	<b>none</b>	<b>Group x is deactivated</b>
<b>STUDARK</b>	<b>0A</b>	<b>none</b>	<b>All students screens are dark, mouse and keyboard blocked</b>
<b>STUWORK</b>	<b>0B</b>	<b>none</b>	<b>All students screens are switched back to the environment they were in before</b>
<b>STUALLON</b>	<b>11</b>	<b>none</b>	<b>All students screens show the picture on the network</b>
<b>STUALLOF</b>	<b>12</b>	<b>none</b>	<b>All students screens are switched back to environment they were in before</b>

# Audio: Teacher to all Students

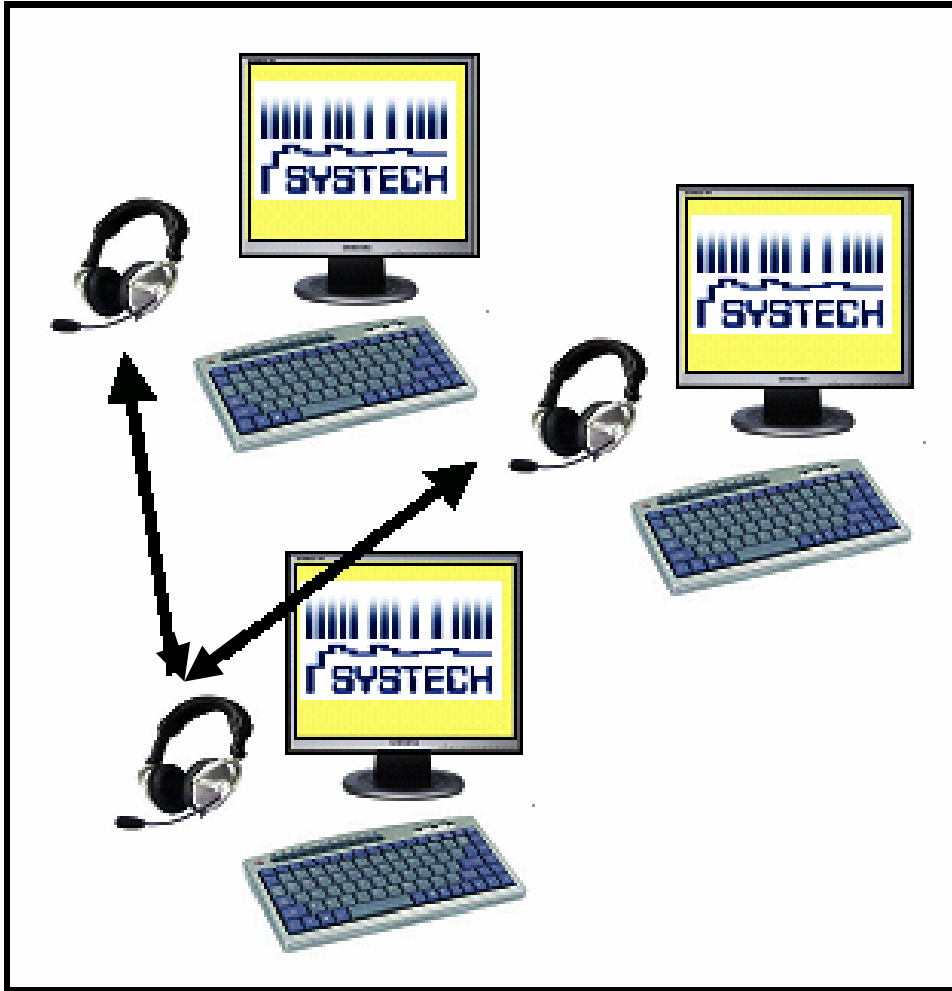


Command:

GENERAL STALLON

Oneway-audio-connection from source to all students

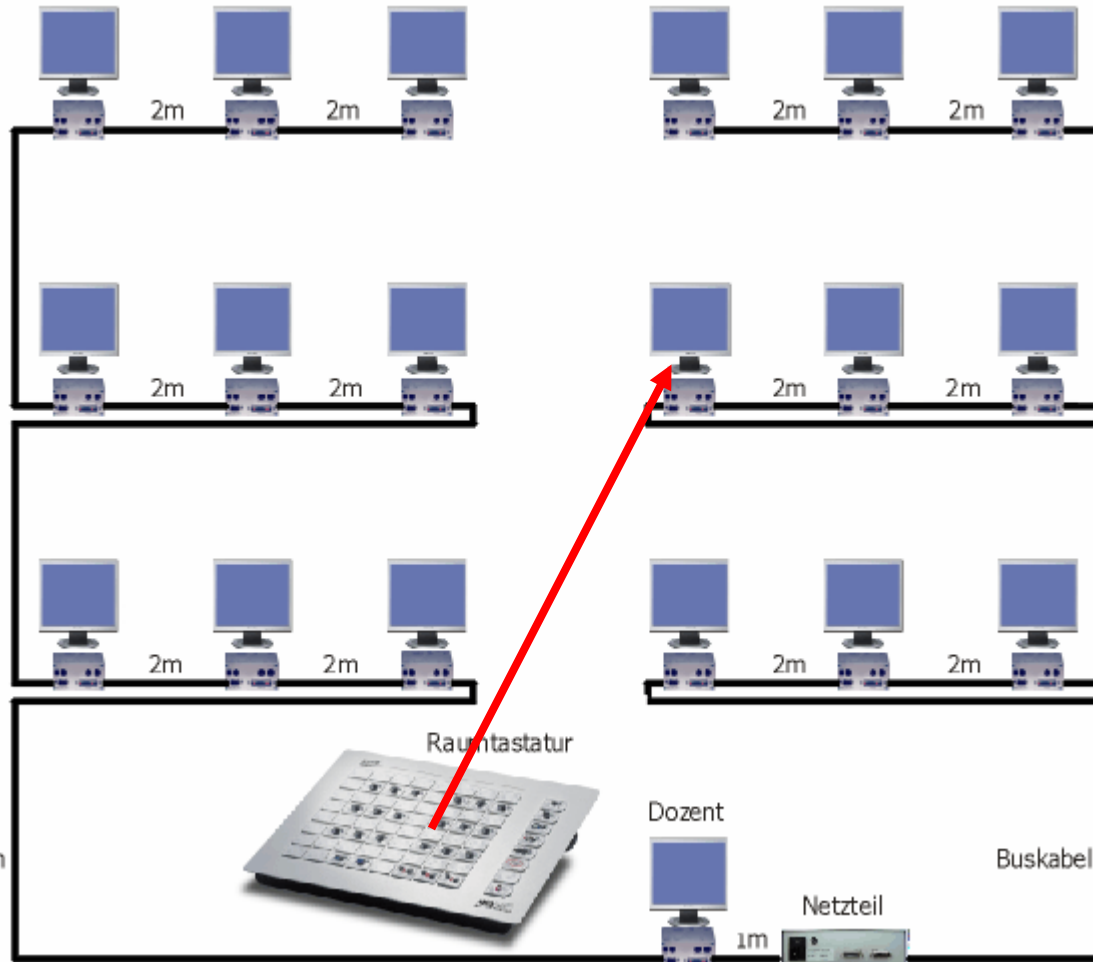
# Audio: Conference



GENERAL AUDALL

Attention:  
Hardware does not allow this function at this time.

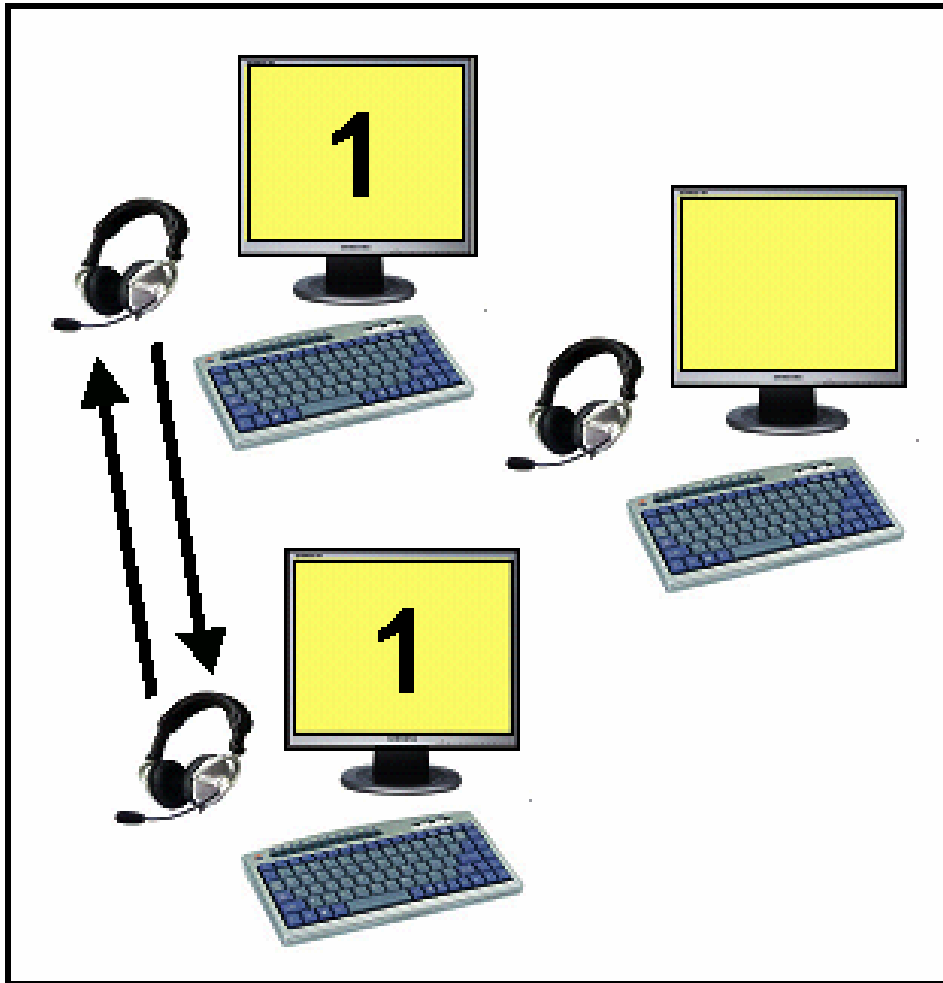
# Individual Instructions affect only one unit at a time



# Examples of Individual Instructions

<u>Instruction</u>	<u>Value (HEX)</u>	<u>Reply</u>	<u>Short Description</u>
<b>STURX</b>	<b>01</b>	<b>none</b>	<b>Student-unit gets picture from network</b>
<b>STULOC</b>	<b>02</b>	<b>none</b>	<b>Student-unit in local mode</b>
<b>STUTX</b>	<b>03</b>	<b>none</b>	<b>Student-unit transmits picture to network</b>
<b>STURXMK</b>	<b>04</b>	<b>none</b>	<b>Master (Student)-unit gets picture from network and takes control of mouse and keyboard of source of picture</b>
<b>STUTXMK</b>	<b>05</b>	<b>none</b>	<b>Student-unit transmits image and mouse and keyboard are remote controlled*</b>

# Audio: 2-Way-Communication



STUDENT1 STURXMK  
TEACHER STUTXMK



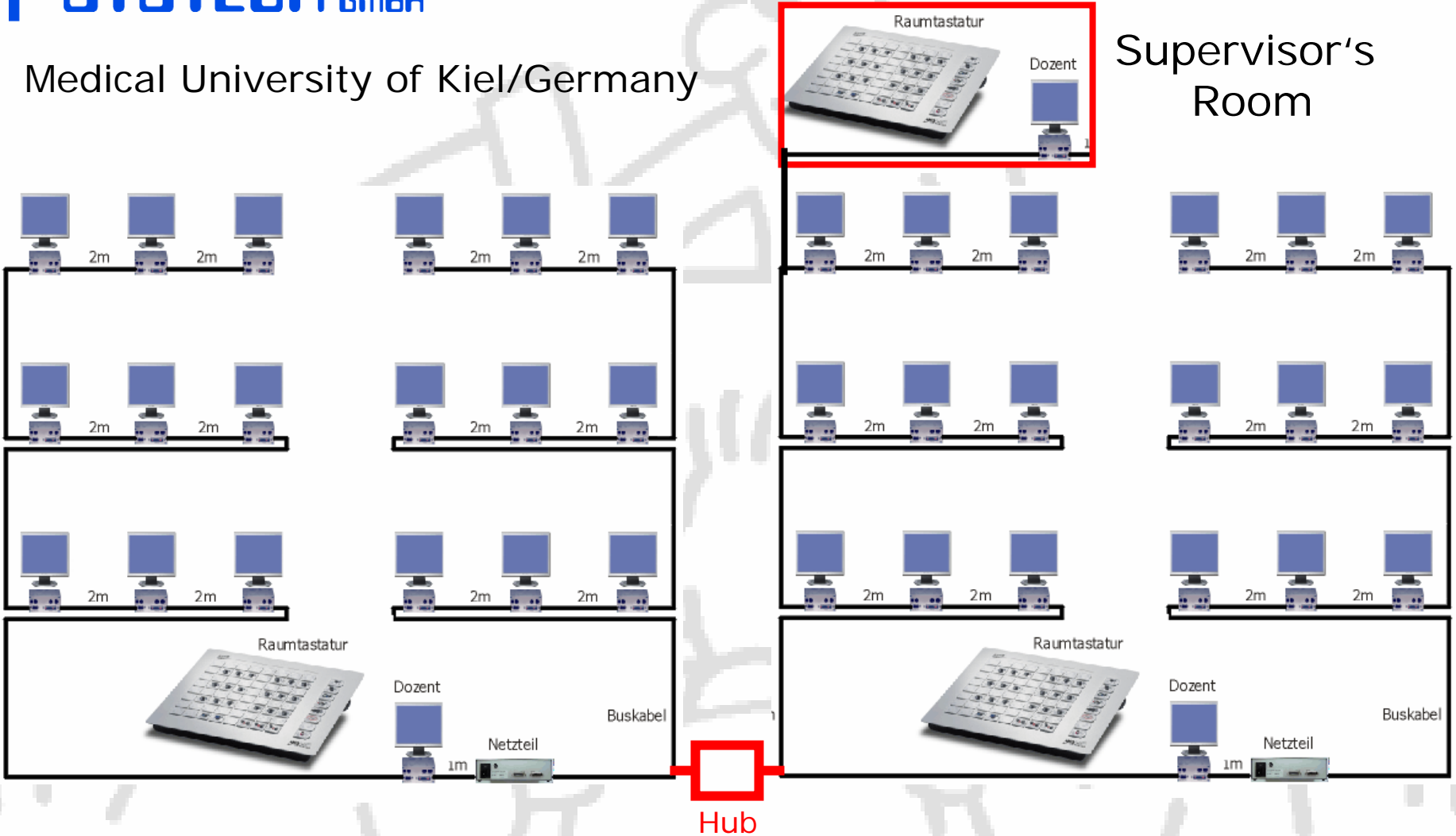
# Switchover-Sequence

1. Master 1 transmits the mastercode GENERAL MASTER1 every 200ms and with this prohibits the automatic activation of Master 2
2. Master 2 responds to GENERAL MASTER1 with MASTER 00H.
3. Master 1 stops transmitting
4. Master 2 takes over control of the whole network

# Example Coupled Networks

Medical University of Kiel/Germany

Supervisor's Room



# Couple-Sequence

1. Master 1 and Master 2 transmitt the mastercode GENERAL MASTER1 and GENERAL MASTER2 every 200ms in their networks
2. Master 1 sends GENERAL NETJOIN
3. HUB responds to Master 2 with MASTER 00H and back to Master 1 with GENERAL DELAY(repeatedly)
4. Master 2 stops transmitting
5. HUB detects timeout responds to MASTER 1 with Master ROK
6. Master 1 take over the control of the two networks

# Address-Structure

15 Adresses per Student are necassary:

- 5 Studentaddresses, one for each master
- 5 Beameraddresses, one for each master
- 5 Teacheraddresses, one for each master

According to the address sent, the unit will perform as a Student's-, Beamer's or a Teachers-Unit.

Once Programmed the Master-Unit can be exchanged without reconfiguring the Master-Unit.

# Hub-Properties

At the moment it is assumed, that the HUBS do not need to take any commands except the HUB which can couple two networks.

Usual Ethernet-HUBS do not delay the transmission, but route the signal nearly in realtime – so we should do this too. That would make the programming of the HUBS much easier.

One other thought: The automobile-manufacturers have a Low-Speed-CAN which can cope with 40m length at 100 kbit/s without termination resistors. They make a tree out of it. At 19,6kbit/s this should work up to 200m – and would simplify the control-routing considerably.

# Configuring the Students-UNIT

*We propose to use the INFO SCREEN – switch to allow programming of the unit. So you need not to dismount the unit if fastened to the table or in a cable canal.*